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The Physiotherapy Review

Volume 18 Number 2

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The Physiotherapy Review

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The Making of Arm and Hand Splints

Anne Prochazka, R.N.

Since it is very important that paralytic patients receive proper splinting as part of their early care and because the expense involved in having braces made by a bracemaker is prohibitive for many such patients, a method was devised for making improvised wire splints. Nurses and physical therapy technicians with no specialized mechanical training or ability have made such splints using a wire sufficiently pliable that it may be bent with strong pliers and yet firm enough to give the necessary support.

The wire arm-abduction splint originated from the need of keeping an arm in a desirable position in the aftercare of poliomyelitis. It is a support that can be attached to the patient's body and holds the arm in a fixed position when the patient moves. Thus, it prevents the stretching of the weak muscles and contracture of the strong ones. This splint evolved from a single wire frame. The attachments and reinforcements were suggested and added as a result of subsequent experiences.

I—*Equipment needed*:

Wire—gauge 9 or 10, a pair of strong pliers for bending the wire, file for cutting the wire, tape measure, adhesive, scissors, felt or table padding, one-inch webbing, buckles, needle, heavy thread, heavy cotton stockings, and three corset stays.

II—*The Single Splint Frame*

This splint is made for an arm which is in position of abduction to shoulder level, elbow bent with the palm of the hand facing downward.

Relief Nurse, Orthopedic Division, Visiting Nurse Association of Chicago, 104 S. Michigan Avenue, Chicago, Ill.

A. *Directions for measuring the arm:*

Measurements are taken with the patient in back-lying position and are recorded as follows:

1. From 1 inch below the crest of the ilium front (hip bone) to axilla-front .....inches
2. Axilla-front to elbow-front.....inches
3. Elbow-front to thumb side of wrist..inches
4. Thumb-side of wrist to little finger-side of wrist.....inches
5. Little finger-side of wrist to elbow-back .....inches
6. Elbow-back to axilla-back .....inches
7. Axilla-back to 1 inch below crest of ilium .....inches
8. Crest of ilium-back (hip-back) to hip-front and to the starting point..inches

Total .....inches

B. *Directions for bending wire for single frame (See Fig. 1).*

Straighten out the wire and measure off the length needed. The length equals the total measurements plus 6 inches for overlapping. In describing the bending of the wire, a vertical line through the center of the body is used as a fixed point and the directions for bending the wire are expressed as upward, outward, forward, backward, inward, and downward at right angles.

1. Measure off 6 inches and bend wire to right angle. This represents the angle at the axilla-front; the short end is part of the hip-front to axilla-front (Fig. 1a).

2. Measure the length from axilla-front to elbow-front and bend wire forward (Fig. 1b).

3. Measure length from elbow-front to thumb-side of wrist and bend wire outward (Fig. 1c).

4. Measure width of wrist and bend wire backward (Fig. 1d).

5. Measure from little finger side of wrist to elbow-back and bend wire inward (Fig. 1e).

6. Measure from elbow-back to axilla-back and bend wire downward (Fig. 1f).

7. Measure from axilla-back to 3 inches above the hip-back and bend wire backward (Fig. 1g).

8. Measure one inch and bend wire downward (Fig. 1h).

9. Measure 3 inches and bend wire forward (Fig. 1i).

10. Measure width of hip and bend wire upward (Fig. 1j).

11. Measure 3 inches and bend wire backward (Fig. 1k).

12. Measure 1 inch and bend wire upward to the starting point (Fig. 1l). Join the overlapping wires with adhesive tape. Arch wire that rests on hip to fit the hip. Straighten out the splint and fit it on the patient before applying reinforcements.

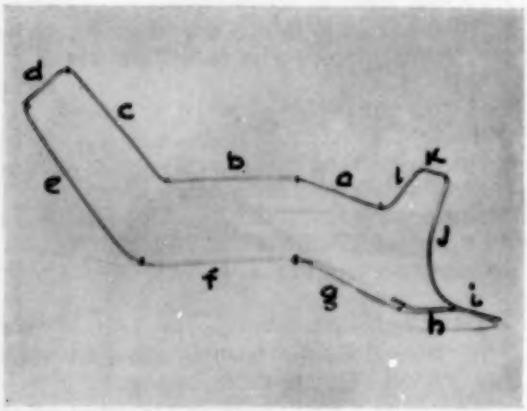

Fig. 1

III—*Reinforcements:* (See Fig. 2 for illustrations showing reinforcements and first attachment.)

A. *Directions for measuring splint for the first reinforcement.*

1. Measure from elbow-front inward to within 3 inches of the angle of the axilla-front.

2. From this point diagonally down to 3 inches below the angle of the axilla-front.

3. Follow the wire axilla-front to hip-front for two-thirds of its length.

4. Cross to hip-back to axilla-back-wire.

5. Follow the hip-back to axilla-back-wire up to within 3 inches of the axilla-back angle.

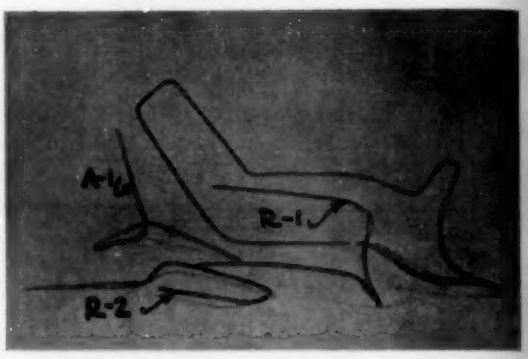

Fig. 2

6. From this point diagonally upward to 3 inches beyond angle of the axilla.

7. From 3 inches beyond the angle of axilla-back to elbow-back.

B. *Directions for bending wire for the first reinforcement (Fig. 2 R-1).*

Straighten wire and measure off the length needed. The length equals the total measurements.

1. Measure wire from elbow-front to within 3 inches of angle of axilla-front, and bend wire diagonally down to 3 inches below angle of axilla-front.

2. Bend wire downward along axilla-front to hip-front wire for two-thirds of its length and then bend it backward.

3. Measure width of splint at this point and bend wire upward.

4. Measure from this point of splint to 3 inches below the angle of axilla-back and bend wire diagonally upward to 3 inches beyond the angle of axilla-back.

5. Bend wire so that it follows along the axilla-back to elbow-back wire on the splint.

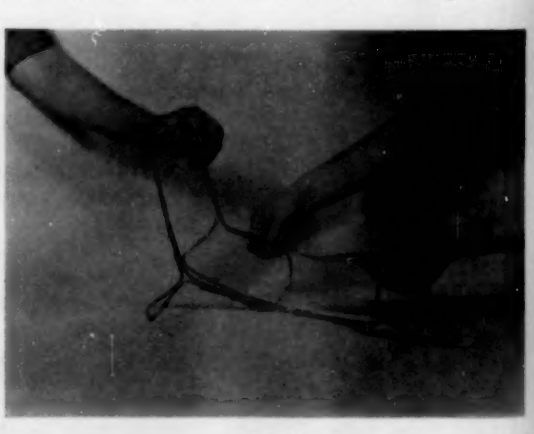

Fig. 3

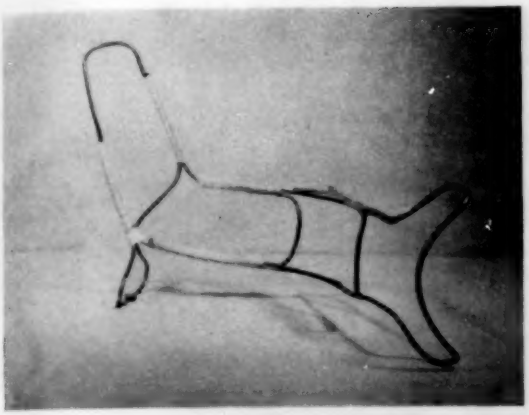

Fig. 4

Place this reinforcement on the splint and join the corresponding wires with adhesive tape (See Figs. 3 and 4).

C. *Directions for bending the wire for the second reinforcement.*

1. From thumb-side of wrist to elbow-front.
2. Elbow-front across to elbow-back.
3. Elbow-back to axilla-back.
4. Axilla-back across to axilla-front.
5. From axilla-front to elbow-front.

D. *Directions for bending the wire for the second reinforcement (See Fig. 2 R-2).*

Straighten out and cut off the wire required for this reinforcement.

1. Measure wire from thumb-side of wrist to elbow-front and bend wire diagonally across to elbow-back.
2. Measure width of splint at this point and bend wire inward to axilla-back.
3. Measure from elbow-back to axilla-back and bend wire forward.
4. Measure from axilla-back to axilla-front and bend wire outward.

Place this reinforcement on the splint and join with adhesive tape. One crossed wire should be at the axilla and one at the elbow. The long end of the wire should end at the thumb-side of the wrist. All crossed wires should be arched slightly to fit the round surface of the arm and trunk (See Figs. 3 and 4).

IV—*Attachments:*

A. *The First Attachment (Fig. 2 A-1).*

This attachment is to prevent the arm from falling backward when the patient is lying on his back.

1. *Directions for measuring the splint for the first attachment.*

a. Measure the whole length from axilla-back to little finger side of wrist and add about 8 inches.

2. *Directions for bending the wire for the first attachment.*

Straighten out and cut off the length of wire needed.

a. Make a loop in the middle of the wire in the shape of a triangle. Place the top of triangle, which is the intersection of the two wires, on the splint at the angle of the elbow-back so that the bottom line of the triangle is parallel with the patient's body.

b. Straighten ends of wire so that one end will correspond with the line of the elbow-back to the axilla-back, and the other end with the elbow-back to the little-finger-side of the wrist.

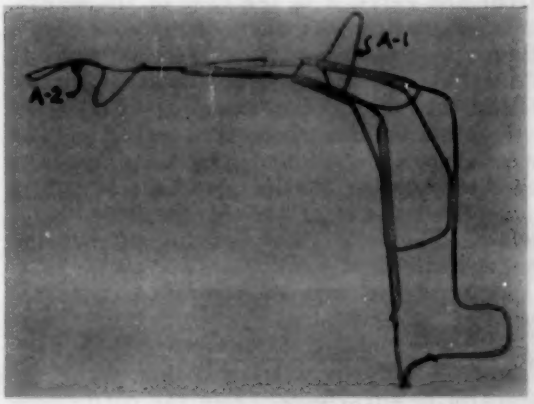

Fig. 5

Join ends with corresponding wires of the splint (Fig. 3).

B. *The Second Attachment.*

Two types of the second attachment are described and are designated second attachment

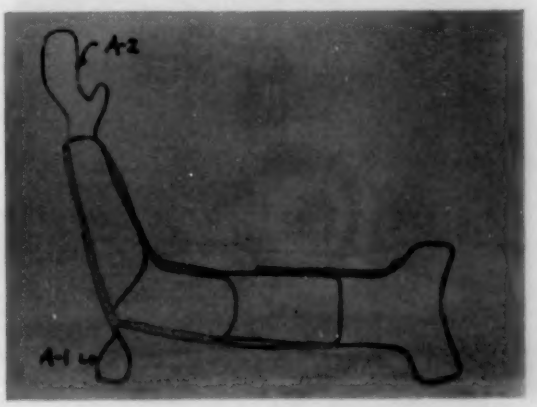

Fig. 6

(a) and second attachment (b). The type used is determined by the muscle weakness of the hand. The second attachment (a) is used when there is a tendency to claw hand and weakness of the opponent muscle of the thumb.

1. *Directions for measuring splint for the second attachment (a). (Figs. 5 and 6 A-2).*

It is difficult to shape a heavy wire into small curves and is, therefore, advisable to use lighter wire (No. 12 fence wire). The hand is held so that the fingers are slightly bent at the first joint, the thumb is in opposition to the middle finger and the wrist is slightly extended.

Estimate the length of wire needed and cut off.

a. Start with one end of the wire at elbow-front and carry it to the base of the thumb.

b. Shape the wire along the outside of the thumb to the tip and make a round bend to direct the wire along the inside of the thumb to the base of the index finger.

c. Make another round bend and direct the wire along the outside of the index finger to one-half inch beyond the tips of the fingers.

d. Bend the wire toward the little finger and bend again along the outside of the little finger to the first joint.

e. Bend the wire in accordance with the bend of the first joints.

f. Shape the wire along the hand to the little finger side of the wrist and then along the forearm to elbow-back. Join the corresponding ends to the forearm of the splint with adhesive tape.

Fig. 7

Fig. 8

2. *Directions for measuring the splint for the second attachment (b).*

This attachment is for the support of the wrist when the fingers are not affected. (This attachment is not shown in the illustrations.)

a. Measure the splint from elbow-front to thumb-side of the splint, across to the little-finger-side of wrist, and from little-finger-side of wrist to elbow-back.

3. *Directions for bending wire for the second attachment.*

Measure off the length of wire needed and add 5 or more inches for the circle that fits into the hollow of the hand. Use the patient's forearm for model.

a. To bend wire, start with one end of the wire at the elbow-front and follow forearm to thumb-side of wrist. Bend wire toward the middle of the palmar side of the wrist and around the belly of the thumb into the hollow of the hand. The wire should not interfere with the motion of the thumb toward the little finger.

b. Make a circle in the palm of the hand and bring the wire back to the middle of the palmar side of the wrist.

c. At the wrist the wire is bent toward the little-finger-side of the wrist and then bent again toward elbow-back.

Attach the corresponding ends of the wire to forearm of the splint with adhesive tape.

V—*Padding and finishing the splint:*

A. *Directions for covering and padding the splint frame:*

1. Cut felt to cover the splint. Split the thickness of felt in two and apply one-half to the inner and one-half to the outer surface of the splint frame. Sew edges of the two halves of felt together with the splint frame inside. The felt should fit snugly over the frame. Draw a heavy cotton stocking over the padded frame, and sew up the open end.

B. *Application of webbing straps and buckles:*

1. Sew a buckle to the end of the webbing. Place end of webbing with buckle, on the splint at the axilla and on its outer surface. The buckle should face forward.

2. Place splint on patient. Carry webbing from back of axilla diagonally toward and across the opposite shoulder, under the opposite axilla, across back and over the shoulder to the buckle. The result should be a horizontal figure 8 with the intersection of webbing just below the back of the neck.

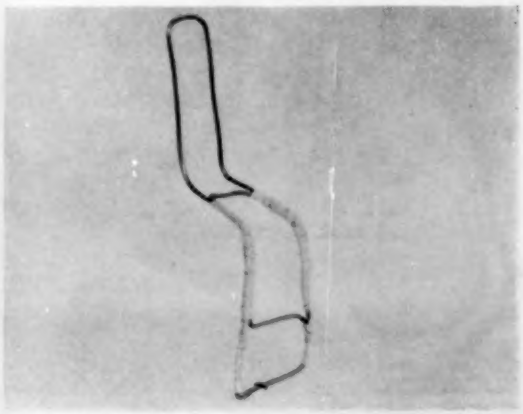

Fig. 9

3. Mark the webbing under the opposite axilla to indicate where padding will be attached.

4. Cut off a piece of felt 2 inches wide and 4 inches long. Cover it with stocking material. Sew this pad lengthwise on the marked place of the webbing. This will prevent the webbing from cutting into the opposite axilla (See Figs. 7 and 8).

5. Make two similar pads, each 5 inches long and 3 inches wide.

6. Measure length from axilla to the hip. Cut six pieces of webbing that length. Sew each two pieces together to make three tubes with one end of each tube open. Insert a steel stay into each tube. Lay the stays on a table parallel to each other and two inches apart. Place the pads across both ends of the stays so that three inches of each end of the stays are covered. Sew the stays to the pads.

7. Cut off two pieces of webbing: one long enough to go around the chest and the other around the hips. Add a few inches to each length. Sew a buckle at one end of each piece of webbing. Place the buckle end of the chest webbing two inches below the axilla on the splint, with the buckle facing forward. Sew it on. Sew the other piece of webbing on the splint in the same manner, two inches above the hip.

8. Place splint on patient. Place stays on opposite side of the trunk so that one pad will be on the hip and the other on the chest. Bring the webbing from the back of the axilla around the chest and forward to the buckle. Do the same with the webbing around the hips. Pin webbing to the corresponding pad. Take splint off patient and sew the webbing on the pads at these points.

9. Make two more pads, each two inches wide and four inches long.

10. Place splint on patient. Place one pad crosswise over the arm just above the elbow. Place the other over the wrist. Cut off two pieces of webbing: one to go around the arm, over the pad and the other over the wrist pad. Add several inches to each. Place buckle end of webbing on the pad lengthwise and sew it to the pad. These two straps are for the purpose of fastening the arm to the splint (See Fig. 7).

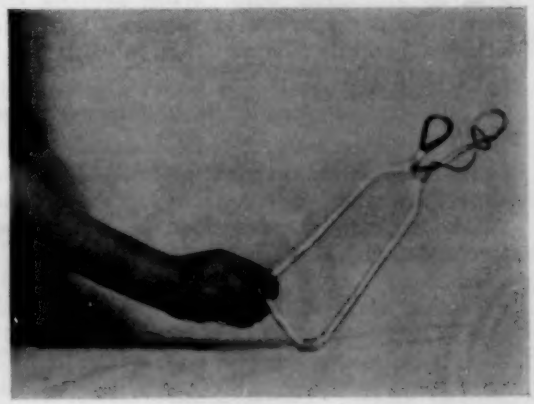

Fig. 10

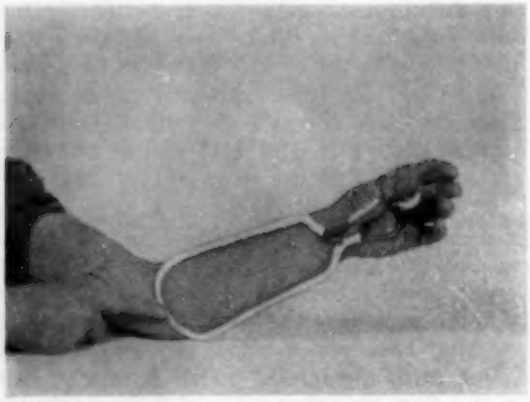

Fig. 11

VI—*Variations:*

Variations are determined by the weakness of the muscles in the arm. (The splint described above is the type most frequently used.)

A. For weak elbow extensors and strong elbow flexors, the wire is not bent at right angles at the elbow but is bent at an angle greater than 90 degrees depending on the amount of muscle weakness.

B. Figure 9 shows a wire splint frame commonly used for babies with brachial palsy where the arm is to be held in abduction, outward rotation and supination; it is constructed similarly to abduction splint previously described.

C. The hand splint in itself offers many variations. The wire should be pliable so that it can be shaped into a single frame directly on the hand without the use of pliers. The single frame may then be reinforced, off the hand, by additional wire. When shaping the wire it is necessary that someone hold the patient's hand in the position in which the splint is to hold it.

D. *Directions for bending the wire for thumb splint:*

Figure 10 shows a thumb splint designed to support a weak opponens muscle of the thumb.

Make a frame as described in the second attachment (b).

1. Start with another piece of wire at elbow-front and follow along the wire of the frame to the wrist.

2. Bend the wire toward the middle of the palmar side of the wrist.

3. Make a sharp bend to below the first joint of the thumb.

4. Shape the wire around the base of the thumb toward the index finger and to its palmar side.

5. Bend the wire upward along the palmar side of the thumb to below the tip of the thumb.

6. Bend the wire around the end of the thumb and toward the outer side.

7. Bend the wire downward along the outer side of the thumb and toward the middle of the palmar side of the wrist.

8. From this point follow the wire of the frame to elbow-back, across to elbow-front and a few inches along front wire overlapping the starting end of the wire.

Join the two frames together with adhesive tape.

Fig. 12

Figure 11 shows the splint framework fitted to the hand.

Pad the framework with felt and cover with stocking material. Attach the splint to the forearm with straps of webbing and buckles (See Fig. 12).

Manipulative Treatment of Lumbosacral Derangement

Report of Series of Cases Treated with Technic Described by Dr. B. S. Troedsson

Mary Craise Thornhill, R.P.T.T.

In 1936 at the Annual Session of the American Congress of Physical Therapy, Dr. B. S. Troedsson presented a paper on a manipulative treatment for relief of pain in the lumbosacral region.

This technic has been used in a small series of cases during the past year, and this report is submitted because the manipulation has given prompt relief in a large proportion of the cases treated. It is also submitted because the manipulation can be carried out by the technician, even though the patient may be large and muscular. The third reason for reporting these cases is that it has proved helpful in some cases where the patient was not aware of an injury to his back, the pain being referred elsewhere.

In considering the anatomic reasons for low back pain Doctor Troedsson refers to Chormley's description of "the facet syndrome" and to his statement that he believed in his cases the trouble was located in the inferior articulation of the lumbosacral articulation, particularly in those cases complaining of a sudden onset of pain in the lower back following some activity. "Sciatic scoliosis is present and muscles spasm sets in and this, although splinting in action, forces the irritated facets together more firmly. Until the muscles spasm subsides or some change in the position of the facets takes place, as by manipulation, pains may persist."[1]

The fact that stability in the lumbosacral region is dependent upon the changes in direction of the articular processes and articular facets of the lumbosacral articulation since man has assumed the erect posture was emphasized by Doctor Troedsson. In the quadruped the superior articular facets of the sacrum are in the hortizontal plane and receive the inferior processes of the fifth lumbar vertebra. The overlapping of these processes gives effective bony support to the body weight, but in the erect posture these processes have lost much of their weight bearing function and there has been a change in their direction as well as the direction of the articular facets. Miltner and Lowendorf found such changes in 70 per cent of 200 cases x-rayed for sacroiliac and lumbosacral sprain.

Dr. Troedsson continued: "It is evident that a lumbosacral area showing such changes in adapting itself to the upright position must become a weak point when returning to the quadruped position especially if the element of weight lifting, rotation or twisting is added. The fact that this region is also the junction of a flexible part, the spine, and of a solid part, the sacrum, increases the weakness and contributes to making this area the breaking point. If the force is great enough, it is easy to see that a slipping could take place uni- or bilaterally, depending upon the tropism of each joint. It must be minute or else we would be able to detect a changed alignment by physical examination or by x-ray. Improved x-ray technic may make this possible in the future."[1]

Attention was also called by Doctor Troedsson to the fact that the foramen between the fifth lumbar vertebra and the sacrum is smaller than the other lumbar nerve foramen, and a slight change in the articulation might cause pressure on the nerve fibers, thus producing pain.

The typical history of these cases was described as a sudden pain in the lower back while stooping or lifting, sometimes radiating across the back, to the groin or down the leg. The patient walks stiffly with the lower back held rigid, has difficulty in sitting and finds

1835 Eye St., N. W., Washington, D. C.

it nearly impossible to take off his shoes. Forward bending is limited and painful. This may be tested by having the patient lie on his back on a table, the operator holding down his feet. The patient usually is able to flex his trunk only 10 to 40 degrees before being stopped by pain. The patient usually will indicate the point of greatest pain in the lumbosacral region. Palpation over the articulation reveals tenderness but no pathologic change.

Treatment: "The patient is put flat on his back on a solid table, asked to brace himself by holding onto its sides. The operator stands at the foot of the table, and, with a firm grip around the patient's ankle, proceeds to flex the patient's thigh and leg on the trunk. Then the patient is told to give a violent kick on command. As the patient kicks, the operator makes a sudden strong pull on the ankle. The direction of force should be in the body line and at a slight angle with horizontal plane. The patient's kick and the operator's pull should be coordinated to give a maximum force when the extremity reaches full extension. Both extremities may be used instead of one. The treatment is continued until the patient is able to flex his trunk on his lower extremities freely and only soreness remains. The average treatment requires from 5 to 10 kicks. It can readily be seen that with the kick and pull there is a separation of the sacrum and lumbar spine. At the same time there is a very distinct forward thrust of the sacrum on the fifth lumbar vertebra, opposite to the direction in which the slipping has taken place. The patient's recovery is so prompt it is hardly possible to conceive of anything but a reduction having taken place, restoring the joint surfaces to their normal position, permitting free motion, relieving pressure on the nerves as they leave the foramen between the fifth lumbar vertebra and the sacrum directly anterior to the inferior articular processes.

"Interest should, under no circumstances, end with the relief of the patient from acute pain. Joint capsules and ligaments have been stretched and there may be effusion and swelling around the articulation. Rest, support, heat and massage are required and should be kept up for two weeks or until all soreness has disappeared."[1]

In accordance with the above technic, cases of injury to the lower back, a number of them being laborers engaged in heavy work, have been treated with very satisfactory results, the treatment being given by a woman technician on the physician's orders. Heat, either infra-red or diathermy, has been used previous to massage in an effort to relieve some of the muscle spasm and pain. The patient then lies on his back and is instructed how to time his kick. A woman can readily give sufficient pull at the end of the kick to attain the desired result. Following the manipulation the patient again lies face downward while deep stroking is given to relieve soreness. Then unless the patient has a sacroiliac belt, the back is strapped, the strapping extending forward over the anterior superior spine of the ilium and from the middle of the sacrum to the upper lumbar vertebrae. In some cases the patient has reported back for heat and massage only once or twice because the recovery was so rapid. Occasionally it has been necessary to repeat the manipulation.

There have been patients whose pain is due not to a recent injury but has been present for a long time. There usually is no muscle spasm noted, movement is fairly free but somewhat painful, and there is the complaint of more or less continuous backache. Palpation reveals tenderness over the lumbosacral articulation or the sacroiliac joints. In some of these cases repeated manipulation with the heat and massage, sometimes without strapping, has brought marked improvement.

Three or four cases of this series were interesting for the reason that the injury, as described by the patient and confirmed by examination, appeared to be muscle strain. In one case the adductors of the thigh and the abdominal muscles, in another case the hip, and another the groin seemed to be the injured area. However, heat, rest and massage gave no relief. Then the lower spine was examined and some tenderness on palpation found over the lumbosacral or sacroiliac region. Following the manipulation described above, the symptoms were soon relieved.

CONCLUSIONS

The manipulative treatment described by Doctor Troedsson has proved effective in almost all cases of low back pain treated in this series, in which x-ray examinations revealed no abnormality. Doctor Troedsson described it as a treatment for injury to the lumbosacral articulation but it has proved

equally effective in cases of sacroiliac pain and tenderness. The pain is sometimes referred to the hip, groin or thigh and not recognized by the patient as a low back injury.

A woman technician can readily supply the amount of traction necessary when it is coordinated with the kick given by the patient.

Case Histories:

(1) Mr. C. B. Age 60, Sept. 15, 1936. Fell down cement steps injuring back and right hip. In hospital for one week. Came to doctor's office October 1, walking with great difficulty using crutches. Manipulation, diathermy, massage and strapping given. Marked relief from first treatment. Diathermy and massage continued until October 15. Discharged free of disability. This man weighed about 250 pounds.

(2) J. A. Furniture mover. Oct. 5, 1936, slipped off truck injuring back and cutting leg. October 8, back manipulated and treated with heat and massage. Patient felt immediate relief and did not return.

(3) Miss D. L. Age 35. Jan. 9, 1937. Complained of pain in lower right quadrant, pain in hip, right sacroiliac and stiffness. Had had pain in right sacroiliac for ten years. Pelvic examination revealed cystic ovary. Pressure over ovary caused pain to radiate toward back. X-ray examination of lumbar spine, sacroiliacs and pelvis showed no abnormality. January 11—Operated upon through McBirney incision, cysts of right and left ovaries punctured. Postcaecal appendix removed—filled with fecaloids. January 26—Wound healed. Patient still complained of pain and stiffness in right sacroiliac region. Manipulation, diathermy, massage, strapping given Jan. 26, 27, 28, 29. Pain in back and hip entirely relieved.

(4) Miss F. P. Age 22. Fell on stone steps hitting lower back. Diagnosis—Severe contusions and strain of lower back, March 3, 1937. Patient treated with heat and light massage until March 8. Severe abdominal pain made necessary an operation to free adhesions that had formed following appendectomy several years previous. March 23, manipulation, diathermy and massage resumed and continued until April 6. Patient discharged improved but still complaining of some soreness of the lower back.

(5) Mr. R. C. Age 30. Feb. 23, 1937, strained back lifting a heavy rug. Complained of pain on stooping, sitting, walking. Tenderness over lumbosacral area. Manipulation, diathermy, massage, strapping. Immediate improvement. Did not return for further treatment.

(6) Mr. N. C. Laborer. June 28, 1937, lifted bucket and felt pain in lower back. Treated June 29 to July 3. Discharged improved.

(7) Miss F. G. Saleswoman. Caught foot on a box on floor hurting right leg and side, July 3, 1937. Examination revealed pain and tenderness in the lower right quadrant, right hip and the abdomen. Baking and diathermy to abdomen and hip July 3, 6 and 9, gave some relief. Patient discontinued treatment. July 24, patient returned, complaining of severe pain in adductors of thigh. Examination revealed tenderness over right sacroiliac and over crest of ilium. Manipulation done, diathermy and massage continued until July 28. Symptoms had disappeared.

(8) Mr. J. J. July 31, 1937, getting down off high window sill after opening window, strained muscles of left groin. Heat and massage were ordered Aug. 4. Treated until Aug. 9 when patient reported no improvement. Examination of lower spine revealed slight tenderness over left sacroiliac joint. Manipulated. Following day patient felt better. Treatment continued to August 13. Patient discharged free of symptoms.

(9) Miss F. S. Age about 45. Nov. 19, 1937, caught falling locker on upraised arms, straining shoulders and side. While being treated for this injury she mentioned that she had suffered a dull pain in the lower back for years. It had not been increased greatly by this accident. Nov. 24, 26 and 29 her back was treated with diathermy, massage and manipulation. She reported marked improvement.

(10) P. M. Young colored man, janitor. Strained back Nov. 1, lifting a heavy bucket. Examination revealed pain and muscle spasm in left sacroiliac region. Treatment Nov. 1 and 2 gave prompt relief. Nov. 9, returned stating that back was again painful. Treatment resumed. Discharged Nov. 17, free of disability.

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Electropyrexia in Rheumatic Carditis, Chorea and Certain Other Childhood Diseases

S. L. Osborne,* B. P. E., Maurice L. Blatt,** M. D., and
Clarence A. Neymann,*** M. D.

Since we first reported on the use of artificial fever by high frequency currents in 1929,[1] the question of its effect on the cardiovascular system has never ceased to interest the medical profession. From the very beginning the reactions of the heart to heat were of grave concern to us. During our very first attempts to heat up general paretics by diathermic currents, we focused our attention on the heart. For this reason electrocardiographic studies were made on the first patients we treated. Our findings were submitted in our second paper before the American Medical Association in June 1930.[2]

These studies revealed that immediately after a sustained intensive treatment, the rate of the heart is increased, the R-S is sometimes slurred and the T-waves are often obliterated in all the leads. These changes might suggest some damage to the heart muscle or to the conductive apparatus. However, twenty-four hours after treatment all these findings revert to normal and after a series of about twenty treatments the electrocardiogram remains unchanged. Such changes must, therefore, be evaluated as transient phenomena, owing to exhaustion immediately after treatment.

In the beginning of our investigations we also observed that the systolic blood pressure has a tendency to rise while the diastolic pressure falls. In extreme cases one may observe a systolic pressure of 160 and a diastolic pressure of 0. No murmur or bruit can be heard during the time when this phenomenon occurs and we now believe it to be due to extreme capillary dilatation. This has been measured and observed by one of us[3] and is maximally present at about 40 degrees C. (104 degrees F.). This increased pulse pressure usually occurs during the induction of the febrile period and disappears rapidly as the patient levels off at the desired temperature.

The increase of the pulse rate is proportionate to the temperature of the skin as has been shown by the work of Benson,[4] and Phillips and Shikany.[5] Figure 1 illustrates that a relatively low pulse rate may be recorded if a patient is treated by electromagnetic induction and the temperature of the air surrounding him is not allowed to rise above 43 degrees C. (111.4 degrees F.). In order to maintain the patient's temperature near 40 or 41 degrees C. (104 or 105.8 degrees F.), it is necessary to have the air 70 to 80 per cent saturated if such low external air temperatures are to be employed. The finding in Figure 1 was obtained during a treatment of advanced mul-

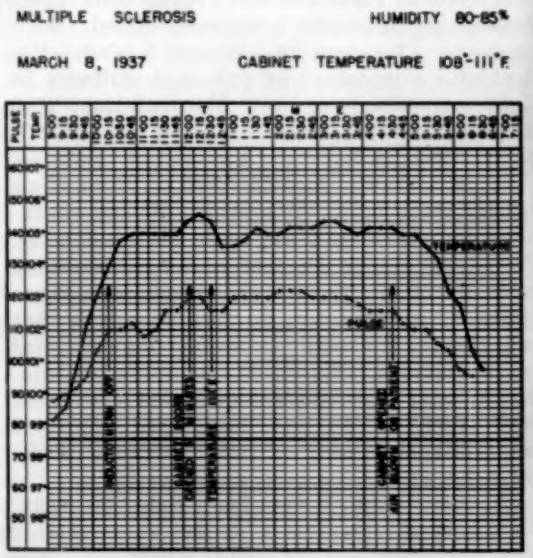

Fig. 1. Illustrating the effect of skin temperature on pulse rate.

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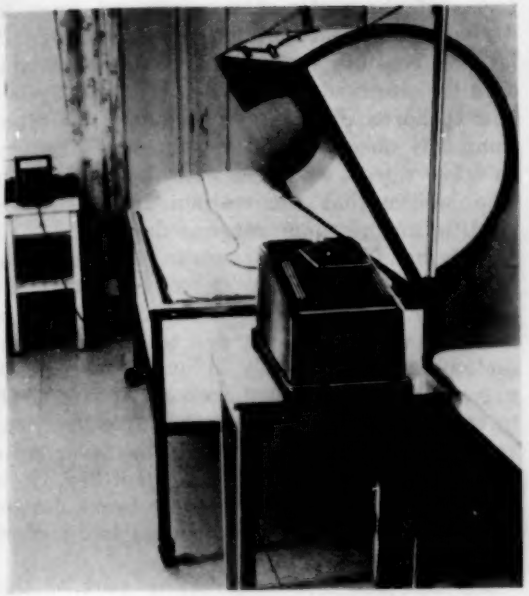

Fig. 2. Illustrating cabinet for fever using electromagnetic induction. Note pyrometer with rectal lead lying on mattress.

tiple sclerosis. Such patients are usually prone to develop high pulse rates and respiratory difficulties. The graph was chosen for this very reason. One can see that the relatively higher pulse rates were obtained when the cabinet temperature was comparatively high and lower pulse rates occurred after air was blown over the patient's body. The cabinet is shown in Figure 2.

While it has become apparent to most of the workers in the field that artificial fever does not adversely affect the normal heart, many cardiologists are still expressing bizarre fears as to what might, could or should happen. These fears are based on their experience with toxic fevers. The great mass of the medical profession has not yet grasped the basic fact that artificial fever is something quite different from fever of toxic origin. Artificial fever especially when produced by penetrating heat,—that is, electromagnetic induction,—is not a fever in the ordinary clinical sense. It is simply a heating of the body—a hyperpyrexia.

It is a far step from heating up a human body with a normal heart to an attempted treatment of heart disease. In spite of the fears of the cardiologist, we have lately turned our attention to heart disease. We had previously observed that general paretics with syphilitic myocarditis and even with aortic aneurysms were not adversely affected by hyperpyrexia and in some cases even improved after treatment. It should be understood, of course, that we did not treat decompensated hearts. Recently we found that some cases of chorea with carditis apparently were relieved of their cardio-vascular symptoms after electropyrexia.

In a series of 25 patients suffering from chorea minor, no less than 7 had some degree of carditis. Ordinarily we treat chorea with eight hours of temperature ranging between 39.7 and 40.5 degrees C. (103.5 and 104.9 degrees F.). If artificial fever really places too great a load on the patient's heart and exhausts the cardio-vascular reserve, certainly something should have happened to these children who, in addition to rheumatic carditis, were suffering from chorea. Besides, they were all poorly nourished and were distinctly not of the type one would select as good risks. We were always expecting trouble, yet were never forced to discontinue treatment because of the heart condition.

The electrocardiograms of some of the pa-

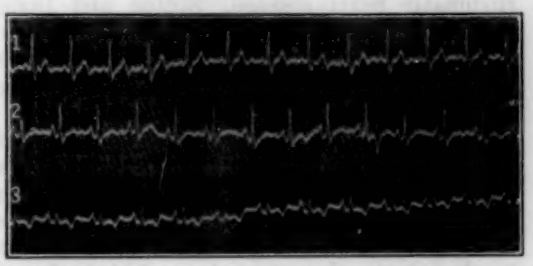

Fig. 3. Tracing in case 17, Aug. 23, 1935, before treatment, showing sinus tachycardia. The patient, a girl aged 16, had chorea with rheumatic carditis. The heart rate was 125. T_1 and T_2 are positive, P_2 and P_3 increased. These changes are frequent in rheumatic carditis. (Neymann, Blatt and Osborne, J. A. M. A., 107:98, Sept. 19, 1936.)

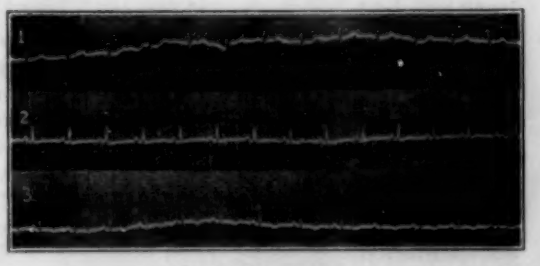

Fig. 4. Sept. 24, 1935, after three treatments: Heart rate, 110. T_1 is positive, T_2 slightly positive. A normal electrocardiogram. (Neymann, Blatt and Osborne, J. A. M. A., 107:98, Sept. 19, 1936.)

tients showed a striking improvement as is illustrated by Figures 3 and 4. The tracing in Figure 3 before treatment shows a rate of 125. T-1 and T-2 are positive, P-2 and P-3 are increased. A month after treatment, the rate had decreased to 110 and a normal electrocardiogram was obtained (Fig. 4). In addition to these objective findings a systolic murmur had disappeared and the patient has felt normal and has lived the life of an ordinary child of sixteen years. The patient was last seen two months ago, fourteen months after treatment, and at that time was in perfect health.

The other six children with chorea and carditis did not show such clear-cut results, yet their murmurs either deceased or at any rate did not increase. They are all attending school and have not developed a state of semi-invalidism so commonly seen when a child has once developed chorea with carditis.

Encouraged by these results and the favorable reports of Sutton and Dodge[6] who induced fever by means of typhoid vaccine injections and an external heating cabinet, we next treated five cases with acute and chronic rheumatic heart disease. Sutton and Dodge reported that eighteen children with rheumatic carditis had improved after hyperthermia. Two of these were suffering from rheumatic carditis without chorea.

Our results in the five cases of rheumatic carditis without chorea were not nearly as good as in the complicated group. Only one of the patients really improved. The other four were just as sick or almost as sick after treatment as they had been before hyperthermia. All were given at least four sessions of pyretotherapy. The same temperature ranges were employed as in the treatment of chorea. Four of our patients were suffering from a more or less chronic form of rheumatic carditis with an acute exacerbation, while one had acquired an acute rheumatic carditis quite recently. One of the four chronic cases improved a little after treatment. The progress of the acute carditis was promptly arrested. It is interesting to note that in this case the sedimentation rate increased from seventeen minutes before treatment to two hours and forty minutes after treatment. In the others, there was no change in the rate of sedimentation.

We hesitate to conclude anything from this series of twelve cases, seven of whom had chorea. It seems probable that the chronic forms of rheumatic carditis are not likely to derive much benefit from pyretotherapy. It is also possible that the type of rheumatic carditis observed in conjunction with Sydenham's chorea differs from some of the types commonly observed without this complication. In other words, we agree with those clinicians who believe that rheumatism and rheumatic carditis are not homogeneous diseases.

Judging from these results and those obtained in rheumatism, chorea and atrophic arthritis, it at least seems probable that a large group of diseases due to rheumatic infection can be favorably influenced by electropyrexia. At the present moment it is difficult to tell when we can expect the infecting virus to be attenuated or destroyed by fever since the virus itself has not been identified. It is also clear that chronic valvular heart disease with scar tissue formation cannot be cured by hyperthermia.

Perhaps the most interesting part of this discussion is that temperatures ranging between 40 and 40.55 degrees C. (104 and 105 degrees F.) do not harm adults and children with valvular heart disease of an acute or more chronic type. The objection expressed by some cardiologists who have been opposed to electropyrexia because they believed this procedure might injure the heart would seem to be disproved.

If we leave carditis and fix our attention on some of the other diseases of childhood, we are confronted by the identical thought of some of the profession in regard to fever in childhood in relation to the heart. Many pediatricians view the whole subject with skepticism and fear. Neymann, Blatt and Osborne[7, 8] treated twenty-five children with Sydenham's chorea ranging between four and sixteen years of age without a fatality and without a single mishap of any kind. These results are surveyed in Table 1.

For the purposes of clinical classification, the group was divided into severe, moderately severe, and mild types. Nine cases were considered very severe and six moderately severe; ten presented a comparatively mild form of the disease. The average period of hospitalization for all cases was less than sixteen days, and the average number of treatments given was slightly less than four. The longest period of hospitalization was thirty-nine days. This child had a very severe chorea, and ten biweekly treatments were given before all twitchings ceased. These ten treatments were

Table 1—Clinical Results of Treatment of Chorea Minor with Electropyrexia*

Case	Sex	Age	Severity	Additional Data	Number of Previous Attacks	Number of Treatments	Treatment Days in Hospital	Number of Months Since Last Treatment	Result
1	♂	9	Moderate	.....	3	2	5	20	A few slight twitchings since discharge
2	♂	9	Mild	Hemichorea	0	2	5	19	No twitchings since discharge
3	♀	11	Mild	.....	0	3	18	18	No twitchings since discharge
4	♂	11	Moderate	.....	0	2	10	17	A few slight twitchings since discharge
5	♀	11	Severe	.....	0	2	30	16	No twitchings since discharge
6	♀	9	Mild	.....	0	2	7	15	No twitchings since discharge
7	♀	4	Mild	Chorea developed after scarlatina	0	3	17	14	No twitchings since discharge
8	♂	11	Severe	.....	2	2	21	10	No twitchings since discharge
9	♀	9	Severe	Aphasic before treatment	0	10	39	9	No twitchings since discharge
10	♀	9	Mild	.....	1	3	9	9	No twitchings since discharge
11	♀	8	Severe	.....	0	5	21	9	Chorea recurred
12	♀	14	Severe	Chorea of 7 months' duration	Chronic	2	21	9	No twitchings since discharge
13	♀	13	Severe	.....	0	4	12	8	No twitchings since discharge
14	♀	13	Moderate	Rheumatic carditis	2	4	14	8	No twitchings since discharge
15	♂	7	Mild	Rheumatic carditis	0	2	9	8	No twitchings since discharge
16	♀	8	Mild	.....	0	2	6	8	No twitchings since discharge
17	♀	16	Moderate	Rheumatic carditis	2	3	9	7	A few slight twitchings since discharge
18	♂	8	Moderate	Chorea of 4 years' duration	Chronic	9	30	6	No twitchings since discharge
19	♂	9	Severe	Rheumatic carditis	1	9	31	5	Chorea recurred
20	♀	10	Mild	.....	0	5	16	5	No twitchings since discharge
21	♀	10	Mild	Rheumatic carditis	1	2	5	5	
22	♀	13	Severe	.....	0	5	16	4	No twitchings since discharge
23	♀	13	Severe	Great speech difficulty before treatment	0	5	17	2	No twitchings since discharge No twitchings since discharge
24	♂	9	Mild	Hemichorea: rheumatic carditis	0	2	6	2	Chorea recurred
25	♂	7	Moderate	Rheumatic carditis: acute rheumatic fever	0	7	23	1	No twitchings since discharge
						Average 4	16		

**Neymann, Blatt and Osborne, J. A. M. A.*, 107: 938-942, *Sept.* 19, 1936.

the greatest number administered to any one patient. The shortest period of hospitalization was five days, during which two treatments were given. After treatment was begun, the average number of days spent in the hospital by the nine very severe cases was twenty-three, while that of the mild cases was ten. During the period of hospitalization, the child remained in bed without any other medication. The patients were not discharged until all abnormal movements had ceased.

The table surveys the series and the results obtained by treatment. These cases were not selected but were treated as they were admitted to the Cook County Hospital from August 1934, to April 1936. There were nine boys and sixteen girls, as before stated, varying in age between four and sixteen years. The tendency of the disease to attack females and young children is shown in the table. The period of observation after treatment now varies between eleven and thirty months. There have been three recurrences (cases 11, 19 and 24); one was in a girl and the other two were in boys. Their choreiform movements returned within a few weeks after their discharge from the hospital. Case 19 was probably a nonsuppurative encephalitis rather than a rheumatic chorea and perhaps should not be included in this series. The boy has developed into a behavior problem and institutional care has been advised. None of the other patients have shown a return of their symptoms, though eight of the series had had either chronic chorea or previous attacks of the disease. Hardly enough time has elapsed

to make a definite statement except in the first seven cases. Here certainly the disease seems to have been cured. Two cases (2 and 24) of hemichorea were observed. One patient (case 9) was totally aphasic before treatment was begun and two had a chronic form of the disease.

The prompt remission rate of 88 per cent immediately after and as the direct result of treatment means that the period of hospitalization in Sydenham's chorea has been greatly decreased. However, there is another factor which we believe to be of greater importance. The patients are in better general health than those who have been treated with bed rest, arsenicals, and sedatives. It is our belief that, with the exception of those children who relapsed soon after treatment ceased, we have really been able to cure chorea and stop its recurrence. At present this is only a theory based on an observation period of from eleven to thirty months. The next two years will confirm or disprove our assumption.

Finally we treated a little girl with gonorrheal vaginitis, aged ten. Three hyperthermic sessions with temperatures ranging near 41.5 degrees C. (106.7 degrees F.) maintained for five hours were employed. As might have been expected, all organisms disappeared from the vaginal smear, and the gonorrhea, though present for many months and unyielding to other forms of treatment, was cured. Another little girl with an acute glomerulo-nephritis and nephrotic syndrome was not improved by four mild treatments with fever ranging near 40 degrees C. (104 degrees F.) for about six hours during each hyperthermic session. The electrocardiogram showed sinus tachycardia, T_1 and T_2 positive and a low voltage. In other words, there was severe myocardial damage.

CONCLUSIONS

1. Artificial fever does not adversely affect the normal heart or the cardiovascular system, if the doses of fever are those normally employed for the treatment of disease.

2. In our experience, this means artificial fevers ranging up to 42 degrees C. (107.6 degrees F.) sustained from five to eight hours.

3. Rheumatic carditis does not preclude the use of electropyrexia.

4. On the contrary, children and adults with rheumatic carditis may be aided by hyperthermic sessions ranging near 40 degrees C. (104 degrees F.) for eight hours.

5. Other forms of heart disease are not adversely affected by artificial fever if the heart is not decompensated.

6. Children may be treated with electropyrexia with temperatures ranging up to 40.55 degrees C. (105 degrees F.) sustained for eight hours. This is a perfectly safe procedure provided penetrating heat,—that is, electromagnetic induction,—is used to produce the fever.

7. The choreiform movements of Sydenham's chorea cease in 88 per cent of the cases treated with artificial fever. The movements stop after an average of four sessions of hyperthermia. It is our belief that the disease is thus aborted and will not recur.

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Of interest is the mention that (during the Heian Period—784 to 1186 A. D.) leprosy is a communicable disease transmitted directly from man to man. As curative methods the internal administration of drugs was most important, together with acupuncture and the use of the moxa. Theurgical treatment of disease by means of amulets, prayers to pictures of the gods, etc., was wide spread.—*From "JAPANESE MEDICINE" by Y. Fujikawa, M. D.*

What Do We Owe the Crippled Child?

Samuel E. Kohn, M. D.

The concept of the present day responsibility to the crippled child has taken on a widespread improvement in the past few decades. It is not so many years ago that cripples were considered outcasts. They were not admitted to ordinary society and often became public jests. The world undoubtedly has suffered considerably from this attitude. Crippled in body but otherwise normal they often were left to die or kept in dark places away from normal contacts. Many who might otherwise have contributed to beauty of civilization or might have led his fellowmen to new accomplishments have been deprived of any opportunity toward this end. In the past, only the wealthy cripples were given any opportunity for education or treatment of their deformities. It is commonly believed that Lord Byron had a club-foot, and it is known that had he not been treated by a quack doctor, he might have lived on to produce many more volumes of his beautiful poetry. His foot deformity was treated with great vigor leaving him in great pain. He walked as little as possible and became very fat. For this he dieted continually. This dieting undermined his resistance and he died at the age of 36 of a fever on the battlefields of Greece. His affliction is represented in his drama "The Deformed Transformed" in which Arnold, the hunchback, is being sent away by his mother, Bertha.

"*Bert.* Out, hunchback! *Arn.* I was born so, mother! *Bert.* Out, Thou incubus! Thou nightmare! Of seven sons, the sole abortion! *Arn.* Would that I had been so, and never seen the light! *Bert.* I would so too! But as thou hast—hence, hence— and do thy best! That back of thine may bear its burden; 'tis more high, if not so broad as that of others. *Arn.* It bears its burden—but my heart! Will it sustain that which you lay upon it, mother? I love, or, at least, I loved you: nothing save you, in nature, can love aught like me. You nursed me—do not kill me! *Bert.* Yes—I nursed thee, because thou wert my first-born, and I knew not if there would be another unlike thee, that monstrous sport of nature. But get hence, and gather wood! *Arn.* I will: but when I bring it, speak to me kindly. Though my brothers are so beautiful and lusty, and as free as the chase they follow, do not spurn me: our milk has been the same. *Bert.* As is the hedgehog's which sucks at midnight from the wholesome dam of the young bull, until the milkmaid finds the nipple next day sore and udder dry. Call not thy brothers brethren! Call me not mother; for if I brought thee forth, it was as foolish hens at times hatch vipers, by sitting upon strange eggs. Out, urchin, out!"

The bible and the old biblical studies refer to cripples at frequent intervals. When the Babylonians had conquered the Israelites and they were marching past Nebuchadnezzar, he called out, "Bring me the prisoners that I may pick my slaves from among them, but bring me children in whom there is no blemish." The Babylonians were not alone in their fear of cripples. They assumed, as did many of the early people, that they were possessed with the spirit of the devil. In fact, the word "dwarf," according to Doctor Horwitz of the University of St. Louis in his paper "Cripples' Place in Society Through the Ages," is closely akin to the Sanscrit "dhvaras" meaning "evil one incarnate."[1] The psychology behind this evolution of diction is obvious. The doctor lists four causes for the traditional dislike of the physically handicapped:

1. A dislike of the imperfect.
2. A knowledge that the cripple would be a burden to the community and be a poor soldier.
3. The thought that the imperfect body necessarily harbors an imperfect mind.
4. The fear of evil spirits.

The Spartans exposed their unfortunate children in infancy. The Roman law allowed the father to destroy his children but did not require any uniform procedure. Later the

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Read on November 5, 1937, before the Crippled Children's Division of The Wisconsin Educational Association.

Romans made the first recorded provision to care for the cripples, when Pope Gregory in 590 A. D. included them in his classification of infirm and destitute to be supported by the public funds. Rarely, however, were they allowed to assert themselves. As a rule these medieval cripples, particularly children, were exploited for the purpose of amusement. History shows us that countries of Europe were constantly entertained by deformed jesters and fools, and in Italy, Roman beggars made slaves of crippled children to exhibit their deformities and gain sympathies and monies from the pedestrians.

The first institution founded exclusively for the care of crippled children was the Royal Bavarian School and Home for Crippled Children at Munich, in 1832. From here the movement spread throughout Germany, France, England, Switzerland and Italy in the order named. In the United States the "Hospital for the Ruptured and Crippled" was opened in New York in 1863. Three years later the Orthopedic Hospital and Dispensary took up the same work. The pioneer school for crippled children, "The Industrial School for Crippled and Disabled Children," was established in 1893 for the purpose of making Boston cripples self-supporting. Since that time the work has been taken up throughout the country. Likewise the education of the masses has been improved with regard to the rights and privileges of the crippled children.

This brings up the question, "What rights does the crippled child have and what responsibilities must we assume if we are to expect him to march forward shoulder to shoulder with his healthy brother?"[2]

1. To give him as vigorous a body as human skill can accomplish.

2. To give him an education so well adapted to his handicap that he can be economically independent and have a chance for the fullest life of which he is capable.

3. To be brought up by parents and educated by teachers who understand the nature of the burden he has to bear and who consider it a privilege to help him bear it.

4. We must help him to grow up in the world which does not set him apart, which looks at him not with pity, scorn or ridicule—but which welcomes him exactly as it welcomes every child and offers him identical privileges and equal responsibilities.

5. We owe him a life on which his handicap casts no shadow but which is full day-to-day with those things which make it worthwhile, with comradeship, love, work, play, laughter, and tears—a life in which these things bring increasing growth, richness of thought, release of energy and joy of achievement.

To give him as vigorous a body as human skill can accomplish. This is the responsibility of the physician. If only the parents would see their physician early, the chance for ultimate recovery would be greatly enhanced. Early diagnosis with early repair is imperative. After repair is complete, early activity in experienced hands has done much in rehabilitation. The work of the curative workshops in conjunction with other forms of physical therapy has been very encouraging. In recent years many fraternal organizations have opened clinics and hospitals for the improvement of the crippled child.

To give him an education so well adapted to his handicap that he can be economically independent and have a chance for the fullest life for which he is capable. The problem of teaching the handicapped child always has been a great one. It requires a special type of teacher,—sympathetic, kindly, patient and willing. She must be ready to devote most of her waking hours to these children. Very often it means submerging her own desires and personalities to the end that these children be properly directed. In the past few years a decided effort has been made to have the teacher act not only as an instructor but also as a friend and adviser. In this way education may be directed toward fields in which the handicapped can successfully compete. Further it has become the responsibility of the teacher to advise him as to what field he might best enter.

To be brought up by parents and educated by teachers who understand the nature of the burden he has to bear and who consider it a privilege to help him bear it. One of the most important problems in our responsibility to the crippled child is to keep up his morale. It is the responsibility not only of the teacher but also one of the home as well as of the church. It is too large to be done by one group alone. It is a day-to-day job that begins in the cradle and continues at least through adolescence.

The cripple is easily discouraged. He often realizes the hopelessness of his state. His mind must be made fertile for his ultimate work and his place in society. The most enduring bulwark of personal and civic morale is a sound buoyant adaptable mind, steeled

to withstand the financial, social, mental or physical strains or stresses of life, and it must be imbued with an unconquerable spirit.

We must help him to grow up in the world which does not set him apart, looks at him not with pity, scorn or ridicule—but which welcomes him exactly as it welcomes every child and offers him identical privileges and equal responsibilities. A crippled child from the very outset is a problem. Possessing the normal mental, emotional and social needs of any child, but having most of these frustrated because of his physical disability, he finds it next to impossible to adjust himself in a modern social sphere. He cannot compete on equal terms with his fellows in a society which is developed and organized for the normal. Frustration of his normal impulses not only produces feelings of dissatisfaction but often induces efforts to find some other outlets which may prove highly injurious and interfere with healthy mental development.

Most of these children are very sensitive and by nature are introverts. In these children excessive criticism, nagging, ridicule, snubs, sarcastic or disparaging remarks or punishment may produce deep-seated dreads, timidities, unhealthy brooding with feelings of worthlessness, distrust, attempts at concealment or compensation. They often resort to rationalization, day-dreaming and a host of other maladjustments of various kinds which may tend to weaken the child's morale and to exert harmful influences that may last many years and even throughout his lifetime. These children do not take their handicaps gladly and dissatisfaction is very often left unspoken.

Case Study.[3]

"I received an injury at the age of eighteen months which necessitated my staying in bed for six months and afterward left me with a slightly shortened leg. This did not worry me to any great extent in early childhood. I could do practically everything my sister and other children could do. At the age of ten I got the idea that being lame caused pople to like me less, and that seemed to oppress me although the lameness itself did not because it was not of a handicapping nature. The desire for social approval and the hope of compensating for the disagreeable effect of the lameness on people caused me to try to develop kindness and helpfulness and other socially approved traits. It was an attempt to compensate for a felt inferiority. In later school life I could not compete with my classmates in athletics, dancing, hiking and other activities, and so concentrated upon mental activities or physical skills in which I could hope to excel. Whatever success I may have had in these lines I attribute to concentration on them rather than unusual innate ability. The fact that I have been fighting to overcome certain obstacles has tended to develop a stubborn tendency which sometimes brings me into conflict with other people.

"I tend to be seclusive and introverted to a certain extent. I am often alone in my thinking even in a crowd. I like people but am not dependent on them for happiness. This feeling may have been developed from the idea that I could not do what they could and was not just like them and therefore must go my own way. I have succeeded in overcoming this feeling to a certain extent. I can lose myself in the lives of the pupils I teach and in this way seem to have achieved a socialized condition."

We owe him a life on which his handicap casts no shadow, but which is full day-by-day with those things which make it worthwhile, with comradeship, love, work, play, laughter and tears—a life in which these things bring increasing growth, richness of thought, release of energy and joy of achievement.

Case Study.[3]

"One day during my tenth year, my mother noticed that I was developing a spinal curvature. This curvature had begun about four years earlier but remained unnoticed. She took me to the hospital where I was thoroughly examined and given a curative treatment.

"At first I did not pay any attention to the defect. I just felt that I was ill, like thousands of others, and would become better after a short period of time. However, one day as I was running down the street, I heard a boy yell, 'Hunchback, Hunchback.' This name caused me to become depressed. I sensed the fact that I was different from other people. When I got home I slipped into my room and began to cry, wishing and praying that I might die.

"From this time on my life was unhappy. Children and even grown-ups would stare at me on the street as if I were a 'curio' from the circus. Many of them would indulge in ridicule. Whenever I was asked by a neighbor to go on an errand, something of this nature would be said, 'If it's heavy, don't bring it, as you are a cripple.' It seemed as if this word

always made me feel that I was a liability to myself.

"School life was really boresome. I seemed to have no pupil friends. They spoke to me at times but they were not chummy. On the playground I seemed to be an outcast. I was never invited to participate in the games. I had an inner urge to be active in school affairs. I wanted a chance to debate, to orate, to take part in dramas. But no one ever asked me to participate in any extracurricular activities. I was always overlooked when a program was prepared. It was about this time that I decided that I was a worthless individual born with a curse.

"At home we were very happy. My mother did her best to keep the house attractive and make it enjoyable. I liked to be home with my brothers and sisters. But mental depression assailed me when my brothers and sisters would go out with their friends. No one invited me to go walking with them. The boys and girls of my age paid no attention to me, and my brothers' and sisters' friends were either too old or too young. As soon as they left the house I began to wonder why I hadn't been born strong and healthy like other people. Why should I live the life of a hermit?

"When I became a junior in high school I was elected class treasurer. This made me happy and I felt that life had reached a turning point for me. I kept my records very accurate and the class seemed delighted in having me take charge of their money. The class was getting ready for the prom. The month of June came and we were asked by the class sponsor to give the names of our guests. Except for myself, every boy seemed to have a girl as his guest. The boys 'kidded' me when I said I was going alone. We were told to wear white flannels and dark coats. I had no flannels nor money with which to buy them. I was singled out (for what reason I don't know) and told most emphatically by the president not to come unless I had flannels. This caused me to realize definitely that going to the prom was out of the question, although I had paid my dues and had worked like a Trojan to collect the money for the prom. No girl to take, no flannels, no ability to dance!

"All of this I blamed on my physical defect. If I had been physically well I would have been more popular; I would have had a job that paid enough to enable me to buy flannels and would have known how to dance. The thought of this gave me great mental pain and it had a harrowing effect upon my nerves. I tried to find relief in sleeping but I couldn't sleep. It was then that I began to fly to the world of fantasy through a daydream. This complex remained with me until after graduation from high school.

"Upon my enrolling at a higher institution I was with a new group. All of the students were strangers to me: Someone asked me my name and introduced me to the rest of the group. They were very friendly to me. I was assigned as chairman of a study group. I was kept so busy that I had no time to think about my inferiority complex. A few months later I had forgotten about the defect. Since then I have learned to realize that life is what one makes it."

Bruce Barton has recently written: "In times like these, invest in boys and girls," his theory being that it is like buying at the bottom and waiting for the investment to accrue. The child will grow up and with proper molding and direction, he may carry the spark of genius in him and he may go far. At least he will become a man or woman, and maybe a great man or a great woman. Think into this the crippled child. He also has latent aptitudes and abilities which need only the torch of understanding and intelligent guidance to set them off. No time can be counted as lost that seeks to to help a child or youth find his way through the mazes of his own disturbed thinking. For the handicapped youth these mazes are even more intricate because of their physical hindrancs. It is just these mental reactions that the wise parent and wise teacher set out to meet and adjust.

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Organizing a Posture Clinic for Children

A Worthwhile Posture Product for Professional Students of Physical Education

Katharine F. Wells

A posture clinic or class for children affords an excellent opportunity for serving the children of the community while at the same time providing a practical laboratory for physical education teachers-in-training. The writer has had charge of such a posture clinic for seven years and is convinced of its threefold value: first, as a means of improving the physical condition of children; second, as a means of educating parents in the realm of body mechanics and closely related aspects of health, and lastly, as a training field for professional students of physical education.

One of the first steps to take in organizing a clinic of this nature is to establish a friendly cooperation between the public schools in the community and the professional school of physical education. The next step is to secure the services of either a pediatrician or an orthopedic specialist who works with children. He must be an altruistic physician, interested in this type of work, because it is not likely that the clinic could afford to pay for his services. The instructor in corrective physical education or individual gymnastics is the logical one to direct the posture clinic, her students serving as the actual instructors. The children can be selected for clinic by their physical education teachers which in many communities would be these same professional students. Letters from the supervisor of physical education in the public schools then can be sent to the parents of these children who need special help for their posture or feet. Such a letter should explain to the parents the advisability of correction at an early age and should give full information regarding the clinic. Attendance at the clinic, of course, would be entirely optional.

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As to the details of the organization, the writer believes that there should be a small attendance fee, preferably ten to twenty-five cents per visit. If desired, a special charge of twenty-five to fifty cents might be made for the first visit, which includes a thorough orthopedic examination, and a small charge—say ten cents—for each subsequent visit. This would enable the clinic to meet its preliminary expenses for notices, supplies, and other necessities. The writer firmly believes that the clinic should be self-supporting. Also, the parents and children should feel that they are getting something worth paying for. It is human nature to feel a greater appreciation for things that cost us something than for those things which are obtained free of charge.

The best time for the clinic to be held probably would be Saturday morning. If possible, the children should come on a definite schedule, the groups being divided according to sex, age, or both; but this may not be practical, especially when several children come from the same family. The logical place to hold the clinic is the corrective gymnasium of the training school or college, provided it is centrally located.

It may prove desirable to have one student act as clerk at each clinic, her duties being to take the attendance and collect the fees. A permanent secretary is also needed to type the records of the physical examinations and to handle the clinic correspondence, this latter being the best way of keeping the parents informed. The fees should be sufficient to pay for this secretarial service, and for stationery, postage and mimeographing. It would be helpful also if the clinic treasury could afford to establish a lending fund for the use of parents who must buy arch supports or braces for their children.

When a child comes to the clinic for the first time, he should be given a thorough orthopedic examination by either the instructor or the physician to determine whether or not he should be advised to join the clinic for the season. If the child has not had a medical examination at school, a brief one should be given by the clinic examining physician, for the mutual protection of child and clinic. If it can be arranged, the doctor should come once a month to examine the children selected by the clinic director. The later should plan to have each child examined by the doctor at least twice during the year. It is most desirable for at least one parent to accompany the child at every examination in order to hear the doctor's diagnosis and recommendations. Where this cannot be done, a complete record of the examination, interpreted so that the parents can understand it, should be sent to them. The students can get valuable experience in observation by taking turns recording for the doctor's examinations. If facilities permit, posture photographs should be taken of the children at the beginning and close of the clinic season. The student assistants can take charge of this.

Every prospective clinic director will doubtless have her own ideas concerning the procedure of the exercise clinic. Some will prefer to teach group exercises with the assistants giving individual correction and help. Others will prefer individual programs, each child having his own card of exercises. Under this plan each student assistant would take one child at a time, making the lesson a truly individual one. If necessary, she might take two or even three children at a time, giving them almost individual attention. Under either plan it would be possible, if desired, to give a few group posture or foot games to stimulate interest and to make the clinic more enjoyable to the children.

Regarding the choice of exercises, the writer believes that these should be frankly corrective. It has been her experience that camouflaged exercises, such as "snake wriggle," "rabbit hop" and "kangaroo jump" are rarely performed in such a way as to be of any real postural or corrective value. Mild "sugar coating," however, may be successfully employed by taking the standard corrective exercises and calling them by interesting names which will appeal to the imagination of the children. Consider, for instance, such an intriguing name as "Pasting paper dolls on the wall,"* for the familiar back flattening exercise. "Sugar coating" is justified only when none of the postural value of the exercise is sacrificed. Each child should have a fairly clear idea of what he is working for. That does not mean that he should know the details of his postural faults. He should, however, have a general idea of good alignment, freedom from tension, and the proper use of the feet. Emphasis should be placed on posture correction in front of the mirror. By learning first what the correct position looks like he can be taught gradually to know what it feels like. In other words, his kinesthetic sense can be trained through the channel of his visual sense.

The length of each child's lesson will depend on his age, the minimum time being fifteen minutes, and the maximum being half an hour. The exercises may be made out by the professional students and should be based on the findings of the orthopedic examination, the recommendations of the physician and the posture photograph. Each program should, of course, be gone over and approved of by the instructor before it is used. The instructor should also supervise the teaching and help with the mirror correction. In this way she can keep in close touch with the needs and the progress of each child, as well as help the students in their teaching. It will be advisable to have the children wear either bathing suits or play suits for clinic.

The value of a posture clinic as a means of parental education has already been mentioned. The average parent's understanding of posture is amazingly inadequate. Parents are interested in having their children hold themselves well, but the only kind of "help" they know how to give is a nagging reminder to "sit up straight and put your shoulders back." They rarely consider the relation of furniture, lighting, clothes, et cetera, to posture, and it never seems to occur to them that their own personal example has anything to do with their children's posture. At the clinic they have an opportunity to notice how careful the instructors are to get a footstool when the child's feet do not reach the floor, and during the physical examination they may be asked questions concerning the type of garter waist worn by the child, the style and size of shoes and stockings, the relation of the furniture to the size of the child, and the possible influence of the position of the lights on the child's habits of sitting. In short, their eyes should be opened to the importance of the part played by the environment in the formation of pos-

*Suggested gy Leah C. Thomas.

ture habits. In addition to this a definite effort can be made to teach the parents the kind of tactics to follow at home. They should be encouraged to adopt the "play spirit" by using posture games and charts to stimulate the children's interest. They should be shown the futility of nagging and urged to express approval whenever they can conscientiously do so.

The parents who accompany their children to clinic invariably want to know what exercises they can do at home. These should be advised with considerable caution. No matter how intelligent and well-meaning the parents, the writer believes that none but the simplest and most fool-proof exercises should be given for home practice. Care must be taken to guard against the possibility of a child doing an exercise in such a way as to increase, rather than correct his defects. The exercises most frequently suggested at the clinic with which the writer is connected are resting on the back with a roll under the shoulder-blades, abdominal pumping and deep breathing in the hook lying position, back flattening in both the lying and standing positions, and stretching tall in the cross-legged sitting position.

At this same clinic a form letter is sent to every parent soon after the child is admitted for exercises. Suggestions are made concerning the adjustment of the furniture to the child's use and methods of stimulating the child's interest. The exercises listed above are carefully described and illustrated, and attention is called to the importance of the child's general health habits, especially those of nutrition, activity and rest. Individual notes are sent from time to time as occasion demands. These go mostly to the parents who do not accompany their children to clinic, especially when the examinations are being given. Every effort is made to keep the parents informed of the physical condition of their children.

By means of these various devices the parents gradually come to understand what the clinic is trying to do, and with this understanding comes an intelligent cooperation which will, we hope, be continued long after the child ceases to attend the posture clinic.

Remedial Speech for the Crippled Child

Helen E. Kiefer, B. E., M. A.

Speech is the birthright of every child. Dr. Max A. Goldstein, head of Central Institute for the Deaf, said at the meeting of the National Association in St. Louis in December 1936, that an incomplete compilation of statistics showed that out of a student population of about 50,000,000, approximately 4,000,000 had speech defects, 300,000 are crippled, 80,000 are deaf, and 60,000 are blind. Providing for the educational needs of the defective children, he said, is the most important problem to be solved by teachers and scientists today.

In recent years the public has been stirred to the need of educating our handicapped children. Deaf children are admitted in many day schools today at the age of three and four. Educators realize the need of training these children at an early age in order to provide voice building, breathing, lip and tongue exercises before the delicate muscles of the voice box become set or rigid. This is equally true of the spastic child. Various exercises are given to strengthen and to activate the muscles of the limbs and body of the spastic child while little or nothing is done to loosen and strengthen the muscles of the speech organs or build the voice. We are all familiar with the emotional and psychological maladjustments that often accompany the crippled child. This is equally true of the speech defective child. Much of his happiness and adjustment can be accomplished by systematic

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speech work, because through the remedial work the child gets hold of himself, gains more confidence in himself because he can help himself, see and feel his improvement. He gets a new grip on himself and often is a completely new child.

Speech is made up of elements which are classified as consonants, vowels and diphthongs. In the English language we have twenty-six characters to represent about forty elementary sounds in the language. The consonants are classified as breath or voice consonants; for example, *t* is a breath consonant while *d* is the voiced form of the same position. All vowels are molded in the mouth and take the shape of the mouth. Great care must be exercised to get good positions even to the point of exaggeration but not distortion. Diphthongs are a combination of two vowels; for example, *i* is made up of *ah* and *ee*. *ā* is made up of *ĕ* and *ĭ*. There are three nasal consonants; namely, *m*, *n*, and *ng*. These should play an important part in building the voice.

To develop a good voice all training should start with proper breathing; that is, diaphragmatic breathing. Make the child conscious of good breathing. The child can get in the habit of breathing deeply ten times when lying in bed at night. Here he learns the "feel" of deep breathing. Or pretend to smell a rose or a sea breeze. Keep up the breathing exercises until the child unconsciously breathes correctly. The breathing exercises should be given at an earlier period than the speech period. Then from this develop a good strong voice, using vowels (use the best one the child can give) with the voice pitched low. The production of the elements must be exaggerated but not distorted, because our aim is to have the pupil conscious of the feeling of the elements as we teach them. He must train his ear to hear good vowels and consonants. All exercises have a three-fold purpose,—breath control, voice control and muscle control.

Conscious tongue and lip exercises should be given to develop strength in the tongue and lips. Following are a few simple exercises for the tongue and lips:

1. Mouth open, thrust tongue straight out and in. (If child has difficulty in doing this show him in a mirror.)
2. Mouth open, touching each corner of the mouth. (Use the mirror if necessary.)
3. Pucker lips *to think* but *not to say* oo—ee, oo—ee, et cetera.
4. Tongue rolling all around the lips (licking off some jam).
5. Tongue touching upper and lower lips.
6. Smack lips ten times as in kissing.
7. Crack tongue or point tongue behind the upper teeth.

Voice building exercises:

1. Take a deep breath and sustain the vowels with m or n.

m——aw	noo
m——oo	n—ee
m——ow	n——o-e

2. ng gee } this exercise forcibly opens up
   ng gaw } the nasal resonators
3. ububub—The end of the nose is gently closed by placing the finger and thumb against the openings of the nostrils.
4. udududud

A typical lesson for an oral inactivity case of the primary grades.

Select a consonant the child can easily give. For example,—t—write *t* four or five times in a notebook in large strong strokes. (Use crayolas,—we want bold strokes so that the child may get the "feel" of power and strength.) The child repeats *t*, each one distinctly and with a well placed voice.

Second step—

Use initial syllable drills. These drills are used to establish a habit and all drills should lead up to a word.

tee—tee—tee
ta-e ta-e ta-e
too—too—too
to-e toa to-e

(Use two colors to bring out the consonant and the vowel more distinctly.)

This syllable drill led up to the word toe, so on the third page of the child's notebook, paste a picture of a toe and write the word, *a toe*, in two colors under the picture.

On page four in the notebook put the final syllable drills—for drill work.

eet eet eet
a-te ait a-te
oat o-te o-te
oot oot oot et cetera

It is well to remember that two fundamental procedures in any type of speech defect are: first, a good voice placement, which includes good breath control, low quality of voice, and a strong voice full of punch and confidence, and second, good positions for all elements, work for exaggeration at first in positions so that the pupil will get the feel of the position.

The Diagnosis of Disorders of Speech

C. R. Strother, Ph. D.

Within the past few years there has been a rapid growth of interest in the speech problems of the physically handicapped child. Professional journals are devoting an increasing amount of space to discussion of these problems, orthopedic hospitals are adding speech therapists to their staffs, physicians and surgeons are more frequently turning to the speech pathologist for advice and assistance in the management of speech disorders in children in whom, by reason of a physical handicap, facility in speech assumes more than average importance.

For some time to come, the burden of speech correction work in the majority of these cases will have to fall on the teacher, nurse, or physical therapist whose duties bring her into constant contact with the child. It is consequently of some importance that those on whom falls the responsibility for training the physically handicapped child should be able to recognize at least the more common disorders of speech and should have some knowledge of the procedures involved in determining the causes of these disorders. This is especially to be desired in the case of the physical therapist whose general background and the nature of whose work make her capable of valuable service in the improvement of the speech of those children whose principal need is therapeutic exercise and training of the speech muscles.

The speech problems found among physically handicapped children are not limited to disorders directly attendant on the child's physical disability. The spastic child whose spasticity affects the muscles of respiration, of phonation, or of articulation will exhibit a speech defect which is directly due to his physical condition; but the spastic paraplegic, whose speech muscles are unaffected, may also exhibit a speech defect which, in his case, is obviously not directly related to his paralysis.

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A simplified classification of speech disorders will prove of assistance in enabling one to identify, and eventually to diagnose, speech difficulties. From the layman's standpoint the simplest classification is a symptomatic one. On this basis, all speech disorders fall into one or more of the following groups:

I. Disorders of Language

Under this heading are to be placed all cases in which (to use an expression of Henry Head's) the individual shows an incapacity in symbolic formulation and expression—that is, cases in which there is a deficiency in the ability to understand or to use vocal or graphic or gestural language. These disorders occur most commonly in mental deficiency, or aphasia.

II. Disorders of Articulation

Under this heading are to be placed all cases in which the individual exhibits phonetic difficulties—that is, difficulty in the formulation of speech sounds and their combination into intelligible words. Under this heading come the cerebral and cerebellar dysarthrias, cases of facial, lingual, or palatal paralysis, "baby-talk," lisping, cleft-palate speech, et cetera.

III. Disorders of Voice

Under this heading are to be placed all cases in which the voice is pitched too high or too low, is too loud or too soft, or has an unpleasant quality.

IV. Disorders of Rhythm

Under this heading are to be placed all cases in which the normal rhythm of speech is disturbed. The most common of these disorders is stuttering.

In cases of speech retardation it is often difficult to determine whether the defect is primarily an articulatory disorder or a language deficiency. Some defects, such as cleft-palate speech, may be classified under more than one heading. In the majority of cases, however, it should not prove difficult even for an inexperienced observer to determine under which of the above classes a given disorder should be placed.

When the child's speech has been observed and his defect tentatively classified, the next step is an attempt to determine the specific nature of the difficulty and to establish its probable cause. The causes of speech disorders may be divided into two general groups, the organic and the functional. From the physical standpoint there are certain conditions of the organism which are essential to the production of normal speech. These conditions may be listed as follows:

1. A sensory apparatus capable of responding to the stimuli on which speech is dependent. For example, a hearing disability may prevent the acquisition of speech or, if it develops after speech has been acquired, it may result in the degeneration of speech.
2. A brain sufficiently developed and sufficiently intact to correlate essential sensory stimuli and to organize appropriate linguistic responses. Mental deficiency or aphasic conditions, for example, will affect the normality of speech.
3. A larynx, pharynx, mouth and nose whose structures are sufficiently normal to permit of the adjustments necessary for the production of satisfactory tones and their modulation into the sounds of speech. (It should be pointed out here that there is not a perfect correlation between structural anomalies and defective speech. Relatively gross structural anomalies *may* exist without materially affecting speech while, on the other hand, relatively minor structural deviations may seriously affect speech.)
4. Thoracico-abdominal, laryngeal, pharyngeal, palatal, lingual and labial musculatures with adequate contractility.

The most common affectation of the sensory apparatus is an impairment of hearing. Hearing is of vital importance in the development of speech. The congenitally deaf child, or the child who becomes deaf in the first few months of life, may go through the babbling stage that characterizes the speech of all babies but will not progress to the stage of putting sounds together in an attempt to imitate the words that are spoken to him. His failure to understand or use spoken language becomes more and more apparent as he grows older. Even relatively slight losses of hearing may seriously affect the child's speech. This condition is, of course, met with much more often than complete deafness. It is quite common in cleft-palate children, due to the high incidence of middle ear infection in these cases. The symptoms presented vary in degree from complete absence of speech to jargon or even to fairly intelligible speech in which some sounds are missing or are slurred. The symptoms are often confusing because the child may hear adequately all but a few sounds. Consequently at times he appears to hear and understand and at other times he evidently does not hear or understand what is said. These symptoms, accompanied by a history of injury to the tympanum, running ear, middle ear or mastoid infection, should lead to a suspicion of hearing disability. An individual audiometer test is desirable. Prognosis is good if the child has average intelligence and can be given competent instruction in lip reading and speech.

It is necessary to distinguish the language disability which is due to congenital or early deafness from two other conditions which present somewhat similar symptoms—mental deficiency and a specialized language disability which may be called infantile aphasia. Hearing disability should, if possible, be ruled out first by the administration of a hearing test. The presence of mental deficiency is determinable from the developmental history, observation of appearance and general behavior, and the results of standardized tests of intelligence. The selection and administration of valid tests of intelligence is difficult in cases in which hearing disability or specific language disability cannot be ruled out. In these cases performance tests obviously are to be preferred to verbal tests such as the various revisions of the Binet. In the case of the paralytic child even the customary performance tests are unsatisfactory because the child's motor disability may impose a handicap on the type of performance required. The aphasic child is to be distinguished from the deaf child by hearing tests and from the mentally deficient child by the administration of non-verbal tests of intelligence. Speech training is desirable for the mentally deficient child above the level of idiocy, at least to the point of enabling him to express his needs understandably. In the higher grades of feeblemindedness good speech usually can be attained. Prognosis in the case of the aphasic child depends principally on the general level of intelligence.

Following examination of the child's sensory capacities and intelligence, the clinician is next concerned with the normality of the various structures involved in speech production. The lungs must supply air pressure sufficient to set up and maintain vibrations

of the vocal folds; the vocal folds must vibrate in such a way as to produce a clear, smooth tone; the cavities of the pharynx, nose and mouth must provide ample resonance; and, finally, the tone must be shaped into the various sounds of speech by the palates, tongue, teeth, jaws and lips.

Normal speech places two demands on the respiratory mechanism: that the lungs contain sufficient air to maintain tone throughout a phrase of normal length; that the outflow of air be controlled and steady. There are, fortunately, few cases in which these demands cannot be met. The spastic child, if his spasticity affects the respiratory musculature, will have great difficulty in controlling the expiratory air stream, with the result that the rhythm of his speech may be disturbed, there may be shortness of breath while speaking, and the intensity of the tone may show considerable fluctuation. In testing the adequacy of respiratory control, the child may be asked to produce a steady tone and maintain it as long as he is able to do so without great effort. Adequate duration prior to training is considered to be about ten seconds. If the child cannot hold a tone steadily for this length of time he is in need of training in breath control.

There are many types of abnormality that may affect the cartilages of the larynx and the glottal lips. It is a function of the laryngologist to diagnose these conditions. The speech clinician is concerned merely with detection of the vocal symptoms of laryngeal pathology and should then refer the case to a competent specialist for thorough laryngoscopic examination. The child should be able to bring the folds into adduction and to adjust them to different degrees of tension. These abilities may be tested vocally by asking the child to produce a sharp cough and to sing or speak tones up and down the scale. The tone produced in vocalization should be relatively clear. Hoarseness or huskiness are often the earliest apparent symptoms of serious laryngeal disorders and when chronic should always be subject to laryngoscopic examination.

There are few conditions of the pharynx which affect speech directly. The presence of tonsil tissue, if the mass is large, will have the effect of deadening pharyngeal resonance and, of course, focal infection from this source may affect the voice.

The arch of the soft palate must be sufficiently high to enable the tone to pass freely into the mouth from the pharynx yet, at the same time, the velum must be long enough and flexible enough to reach back to the posterior wall of the pharynx, thus shutting off the nasal passage on the non-nasalized sounds. The position of the velum should be observed when the child is phonating *ha* or *ah*. A mirror held under the nostrils while the child is producing an *ah* will aid in determining the amount of air escaping through the nose. If the velum fails to close off the nasal passages the tone will be nasalized. The wider the opening of the naso-pharynx the more nasalized will be the tone and the greater the distortion of the speech sounds. (This is the source of the difficulty in cleft-palate speech. The speech training in these cases has two objectives: improvement of the nasal closure by further development of the sphincteric action of the velum and the superior pharyngeal constrictor; the development of new habits of sound formation. The first of these problems is to be solved by massage and muscle exercise. This task should be delegated to the physical therapist.)

The hard palate must not be so high or so steeply arched that the tongue cannot easily be brought into approximation to it in the formation of the palatal sounds (the *r*, *y*, *sh*, and *zh*). The tongue must be fairly symmetrical in shape and neither overly large nor unusually small in relation to the size of the mouth. The fraenum must not be attached so far toward the tip that the tongue cannot be raised sufficiently to touch the upper gums in formation of the *t*, *d*, *n*, *l*, *s*, and *z* sounds or advanced sufficiently to touch the lower edges of the upper teeth in formation of the *th* sounds (as in *thin* and *then*). The motility of the tongue may be tested by asking the child to protrude it as far as possible, to touch alternate corners of the lips as rapidly as possible, to touch the upper teeth with the tongue then sweep it back over the roof of the mouth, and finally to produce, *la-ka*, *la-ka* as rapidly as possible. If the tongue muscles are under control, if the tip of the tongue can reach the upper teeth and the anterior order of the hard palate, if the back of the tongue can be pressed against the velum, the tongue can be considered normal for purposes of articulation.

The only teeth of importance in articulation are the upper central and lateral incisors and cuspids. These must be so related to one another that little if any air can pass between or around them when the lower lip is brought

firmly into contact with them. Malformation of these teeth may affect the *th*, *f*, *v*, *s*, and *z* sounds. The presence of prognathism to such a degree that the lips are prevented from coming into contact with the upper teeth, or the tongue prevented from coming into contact with the same teeth, will result in distortion of the sounds formed by these movements, which are, respectively, the *p*, *b*, and *m;* the *f* and *v*, and the *th* sounds. Irregularities of the lip margins or paralyses of the lip muscles which prevent the lips being brought closely enough together to prevent the escape of air will interfere with production of the *p*, *b*, and *m* and possibly of the *w* and *wh* sounds.

Conditions causing stenosis of the nasal passage will also affect the voice, which, lacking nasal resonance, will sound muffled or exhibit a nasal twang. Closure of these passages will result in substitution of the *b* for the *m* sound, the *d* for the *n*, and the *g* for the *ng*.

To recapitulate:

When a child exhibits a disorder of language—that is, an apparent deficiency in the capacity to understand and use vocal language—an investigation should first be made of the child's hearing, second of his general mental ability, and third of his specific language capacity.

When a child exhibits a disorder of articulation—that is, difficulty in the production of speech sounds and their combination into words—organic causes are to be looked for in the structure of the nose, velum, palate, tongue, upper teeth, jaws and lips or in the musculature and innervation of the velum, tongue and lips. Hearing disability and mental deficiency may also be associated with this condition.

When a child exhibits a disorder of voice—that is, an abnormality of pitch, quality or loudness—organic causes are to be sought in the structure of the larynx, pharynx, nose, or velum, or in the musculature and innervation of the larynx and velum.

When a child exhibits a disorder of rhythm, the possibility of spasticity or chorea must be considered.

If any of the above conditions is found to be responsible for the existing speech defect the condition should, if possible, be eliminated. If the condition cannot be corrected, then special methods of training must be resorted to in order to enable the individual to compensate for his disability.

If no organic causes are found to be operating, it is to be assumed that the speech defect is functional. Functional defects may have an emotional basis or may be due to the establishment of wrong habits of sound formation. Fortunately they usually yield more or less readily to properly motivated, systematic speech training.

Space does not permit discussion of the procedures used in speech training. The following bibliography is appended in the belief that it will be of service to those interested in becoming better acquainted with the problem. The physical therapist should be particularly interested in references to speech training for the cleft palate child and the spastic paralytic. Speech problems in these cases are to a large extent muscular and the physical therapist is in a position to be of invaluable assistance in reducing the speech handicaps of these unfortunate children.

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Residual Neuromuscular Hypertension: Implication for Physiotherapy*

Part VI: Possible Causes As Well As Consequences of Excess Tension

Josephine L. Rathbone, Ph.D

Hyperactivity from Any Cause. We have now come to that part of the discussion which is most important in the light of the evidence assembled from the cases analyzed and in consideration of implications for education and for therapy. If hyperactivity were the result of psychologic aberrations only, the problem would be less grave than it actually is. But hyperactivity is not always motivated by an individual's personal problems. It is often forced upon him by economic and sociologic conditions over which he has no influence or control. Furthermore, it is encouraged in the population in general by the financial standards and worthless goals fostered by the current mores, to say nothing of the mental stimuli offered by modern education.

Would that there had been a few cases from industry for this study. Moderate toil at a slow rhythm is not overtaxing or exhaustive, but most modern highly specialized work, with its intense strain, long hours, repetition, and monotony, has most serious consequences for mind and body. Fatigue arises from the sensory and other psychic strains as well as from the muscular exertion. Adjusting oneself to the constant vibration of machines in industrial plants involves an increased intensity of effort that is most favorable to the approach of nervous irritability. Without question, many industrial workers and laborers would be driven towards exhaustion today as the result of keeping up with machines, if their hours were long enough. The fact that industry has had to modify the hours of work in most trades because of lack of consumption of goods may be a real safeguard to the ultimate health of the worker. A man cannot be expected to withstand the strains of factory life for as many hours per day as he could continue any form of effort individually or in small groups under conditions he could control. For the laborer, today, another problem is introduced—that of how he shall spend his hours of "leisure," so-called. This problem will not be disregarded in connection with some of the non-industrial cases to be discussed before the end of this chapter.

Physical Activity. All forms of effort exhibit themselves by various degrees of muscle tonus. The general musculature as well as the specific muscles used in the tasks are involved. Only a skilled performer can cut down extraneous muscular contractions to the minimum. Only when the skill has become reflexive and automatic can it be performed without extra tensions. It is impossible to train the body to perform complicated acts reflexly and uniformly, under all circumstances, especially if the sense organs are stimulated adversely or the emotional situation is varied.

Although every type of endeavor calls forth muscular responses, effort shows itself "in a gradual increase in muscle tonus" when difficulty is increased.[1] Tension and the difficulty of the task appeared to be directly related. Apparently, greater effort requires a greater number of muscle fibers to be thrown into action, and this results in greater activity, greater oxygen requirement in the muscles involved, and greater fatigue.[2]

The more exacting the effort is, the greater the tension. High tension performers apparently exert unnecessary effort to make their initial efficient responses. It may be said that all performers who force themselves to do a

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*Residual Neuromuscular Hypertension: Implications for Education, by Josephine L. Rathbone, Ph.D., published by the author, New York City, 1936.

job rapidly and well do so at great nervous and muscular expense. As Gilbreth has aptly said, "All champions belong to the same breed."[5] Efficiency of performance appears to be directly related to tension with certain limitations.

If the skilled performer experiences disadvantageous muscular tensions with his efforts, how many more unnecessary tensions will an unskilled performer experience when the task is beyond his ability? If the difficulty involves worry, the resulting tension is augmented and so widely distributed in the body that it seriously interferes with performance. Anyone who has watched another individual trying to work while seriously worried has recognized a resulting inefficiency due to wavering attention and extraneous movements. Apparently the thought processes stimulated by worry either intensify the effort too much or divert attention from the task at hand and cause tensions which impede the central process.

Intellectual Activity. When discussing the results of intellectual endeavor in a previous article of this series, emphasis was placed on the fact that all intellectual effort, desirable as well as undesirable, has the same effects as muscular effort, because it actually calls forth static muscular responses. Attention, controlled association, concentration, and analysis, together with inhibition of impulses —all of which have made for progress in civilization—have been shown to be excessively and rapidly fatiguing.[4]

Everyone has observed some of the common signs of attention, whether an act be mainly muscular or mainly intellectual—the slight but definite posturing of the head which lasts for the duration of the effort,[5] the rigid position of the spine and shoulder girdle, and the fixed expression on the face.[6] In our cases we have watched these tonic contractions become rapidly fixed and constitute serious degrees of residual neuromuscular hypertension which cannot be released without effort and which cause discomfort of varying degrees.

It is small wonder that the type of case presenting itself at Teachers College for corrective physical education, and thereby subjecting itself for this study, should exhibit residual neuromuscular hypertension. As students they "live in an intermittent or continual state of mild hypertension with frequent symptoms of insomnia or emotional irritation."[7] In some instances they are champions who have done hard jobs well; in some instances they are failures whose jobs have been too big for them; in all instances they have been constant workers, leading a life "that would kill a navvy."[8]

In the lives of all individuals, drawn primarily from the professions, one would expect to find mental endeavor to be an important element. Many of the patients that are referred to "physical therapists" by physicians are definitely in these classes. In the instances where lack of physical activity may be discovered in case histories, it is to be analyzed directly as a counterpart of increased mental activity, as well as an indicator of poor hygienic habits.

As far as habits of mental hygiene go, rarely will these cases have obeyed such rules as Alvarez has laid down for those who wish to increase their reserve power: "Avoidance (1) of excessive emotion, (2) of frantic attempts to accomplish in one hour work appropriate to two, (3) of every species of excess which experience has proved leads to general constitutional drain, (4) of attempting to do two things at one and the same time, and (5) of petty engagements which interfere with sleep."[9]

Those adults who fall into this category do not play, have no illusions, are tense, irritable and have single track minds. While their mental horizon is narrow, within this range they are terribly tense and pursue their aims with a grim desperation.[10] May it be possible that education in its many aspects in "civilized" countries has encouraged this reaction,

May the demand for relief from driving, either mental or physical, lead to the wrong types of "play"—to sprees and excesses?[11] Actually, the type of individual presented in these data very often has done the worst thing possible to gain relief from his own particular forms of neuromuscular hypertension—tried to offset them by orgies of other forms of activity. To keep busy seems to be his only aim. Either he drives himself with intellectual or manual work to keep his mind occupied, seeks an avocation which will compensate for the shallowness of the occupation from which he earns his living, or keeps himself constantly on the jump from one pastime to another.

Perhaps the reasons for the excessive activity in many of these cases are beyond the immediate control of the individuals; but does that mean that they are beyond the control of educational, industrial and social agencies in their roles of establishing habits for the

individual and desirable circumstances under which to work?

Sleeplessness. The immediate consequences of driving oneself into a hypertense state and of participating in hectic activity for too many hours is limitation in the quantity and quality of sleep.

Too much emphasis cannot be placed upon the fact that many intellectual workers try to exist on rations of sleep which are far below the necessary minimum. Because mental work tends to drive one to a stage of hyperexcitability, the intellectual worker feels alert and is inclined to scrimp on sleep. When he lives on a minimum of sleep, he is constantly in a stage of physiologic as well as psychologic hypertension, which in its turn will carry the body toward eventual breakdown. A vicious cycle can so easily be set up through which the sleeplessness caused by hyperactivity and refusal to go to sleep can intensify the hyperexcitability and lead to more insomnia.

Since the amount of sleep that can be lost without serious results depends on the constitution of the individual,[12] every effort should be made to encourage those who are below par not to scrimp on sleep. Furthermore, it would seem desirable to protect individuals of low reserves of energy from overexertion.

Among the consequences of insufficient rest are circulatory disturbances of various kinds. It has been interesting to note how many of the cases under analysis have mentioned such disturbances. It was quite astonishing how many cases complained of superficial disturbances in the circulation, such as excessive flushing, excessive perspiration and cold extremities. Others probably would have admitted a like state if they had been questioned. One is to conjecture that either these cases are revealing, by such symptoms, "organic" conditions which to date have been largely neglected by physicians but are likely to cause grave complications later; or these cases are experiencing "functional" insufficiencies and are living precariously below the level of vigorous health because of their indiscretions.

Before leaving the topic of hyperactivity as a cause of residual neuromuscular hypertension, it will be well to discuss too cases (G and H) whose records reveal excess activity with lack of sleep as the main etiological factor. These two women were public school teachers burdened by huge classes and petty routine all day long and stimulated to hectic activity in the evening. In an effort not only to prepare adequately for their classes but to get some joy out of life for their loved ones and themselves, as well as provide for their physical needs, these women had been inclined, for many years, to scrimp on the hours of sleep. Furthermore, because of their personal dissatisfactions and concerns they had been restless sleepers.

It is difficult to separate emotional factors from the general picture of excessive drive which seemed to motivate these individuals. No intimation is offered that the emotional factors have been unimportant in causing the tension, but the suggestion is made that the hyperactivity, not the emotion, was largely responsible for the continuance of symptoms in each case. As evidence to support this point of view is the fact that release in tension, brought about by simple measures—heat, massage, passive exercise, and conscious relaxation, relieved the condition even when the emotional situation was not altered materially. It was apparent during treatment that the individuals seemed less concerned and disturbed emotionally, but no efforts were made to directly affect the conditions causing the emotional unrest or the individual's psychological responses to those conditions.

G was a widow of fifty with three grown boys to support. Never did she intimate any devastating grief at the loss of two husbands, the former by divorce, and the latter by death three years before she came under observation. She was one of those women who was particularly covetous of youth, and she did express a desire for masculine affection and attention, but her main concern was obviously economic not sexual. Her friendships with women were wholesome. She held a good position with adequate income; but in order to run her home as well as her position and to have the recreation she desired, she had to keep busy more hours than desirable. She had had excellent health all her life and was still buoyant and energetic. If financial circumstances had permitted, she would have sought the degree of Doctor of Philosophy for which she was ably qualified intellectually.

As it was, G filled every moment when she was not at work with some occupation demanding energy—swimming, attending or preparing lectures, making candy, crocheting a bedspread, or visiting sick friends. It was difficult to teach her the values of "doing nothing" or to induce her to get more rest. She had "lived" on four or five hours sleep

each night for so long that she was unable to set up another habit readily.

In the midst of her period as a pupil in corrective physical education she lost her voice. At the advice of a physician she finally gave up her work and took a trip by boat to the Pacific Coast during the winter and a cruise the following summer. Her response was excellent, but it is to be regretted that it was necessary for her to take such an expensive form of diversion.

G admits at present to being able to spend an evening by herself at home and to getting to bed and to sleep before midnight. She is much less voluble than at any other time while under observation, and it is to be hoped that she has learned the value of day by day repose which will offset the hazards of her busy life so that she will not need vacations which tax her financial resources. This case has already demonstrated the salutary effects of less activity and more rest on hyperexcitability.

H presents a truly pathetic picture. Her history would have been discussed under the heading of "Emotional Problems" were it not for the fact that her tremendous burden of work with little sleep arouses one's sympathy as much as her worries and concerns. Her husband has epileptic seizures which are getting progressively worse. They have sought medical advice to no avail. H is teaching an elementary school grade in a nearby city, while her husband is living with relatives in New York and is continuing his work under the threat of having to give it up before long. They see each other occasionally for weekends. It appears that H has made as fine an adjustment to her emotional problems as possible. When her husband was under the care of a psychiatrist she was observed as well, and the doctor's comment was that there was no need for concern about her state of mind or health. Still she was very tense neuromuscularly, especially in the arms and upper back, when she reported for corrective physical education.

The main complaint of H was that her school work demanded too much time for petty details. There were numerous records to keep, and she was forced to spend hours each evening in preparation for her classes. She was trying to become a proficient typist, which effort, added to that necessitated by her book work and writing, contributed largely to her localized tensions.

If the physician or other therapist would only study his cases carefully as to their daily routine and energy drive, he would have an index also of why they have physiologic and psychologic symptoms. How can a person stay well when he exhausts his body? Overactivity appears so uniformly in the records for this study that one is led to surmise that only when other factors call forth uncontrolled over-exertion of mind or body do they cause residual neuromuscular hypertension. Furthermore, in the present concern about preparation for the worthy use of leisure time, will theorists fail to see the pressing need for educating dynamic individuals how to balance their lives by periods of repose? The way in which one spends the hours after "work" has been shown to have as great an influence upon one's general health and vitality as the way one conducts himself at "work."

Noise. Some references should be made to the relationship of noise to muscular tensions and to loss of sleep in our own cases. Some observers state that noise causes fatigue and "diminishes the recuperative value of sleep even though sleep is not interrupted, for the brain continues to receive auditory impressions even though it does not analyze them."[13] Other observers claim that successive vibration and unnecessary noise may deplete working capacity more than severe muscular strain, because they distract attention, cause irritation and encourage insomnia.[14] As yet, no thorough and accurate study of noise has been made.

According to our observations, noise has little direct effect upon muscular tension, while the individual's state of muscular tension actually determines his response to noise. As Jacobson has also observed, a violent nervous start in response to loud noise, along with subjective disturbance, seems to depend upon the preceding state of general muscular tonus.[15] When in a relaxed condition, the individuals in his experiments exhibit no visible start at all. It is to be conjectured from this evidence that increased muscular tension is more the cause of nervous starts to noise than the result of noise.

Environmental Conditions. No evidence can be offered from these records to throw light upon the effect of other environmental conditions upon residual neuromuscular hypertension. The cases were all living under urban conditions and in one city—New York. Although many of them had come from distant parts of the country, the influence of their previous surroundings could not be eval-

uated. It would be unfair to ascribe to New York City, however, the responsibility for the tension exhibited by these individuals. Nervous individuals respond to climatic changes, the place varying with the individual.[16] Therefore, it is to be surmised that some individuals may actually have been benefitted by life in New York; especially since, according to some observers, nervous patients as a whole do better at or near sea level and not too far from civilization.[17]

The predisposing causes of neuromuscular hypertension are in the main constitutional,[18] the chief effect of climate being to supply conditions which influence exhaustion and infection.[19] Although some observers have reported lowered tension among the hyposthenic, visceroptotic individuals in the southern part of the United States where humidity and sunlight are higher, and physicians have commented upon the low incidence in China of some diseases associated with hypertension, no accurate study has been made to bar out other influences than that of climate. It is possible that the peoples of Asia have developed the art of relaxation to a high level in association with their traditional philosophies which accord the greatest respect to the man or woman who can lose himself in "bodyless" meditation.

Family Tendencies. In individual analyses, psychiatrists have been prone to place a great deal of emphasis upon the signs of hypertension and eccentricity in progenitors and siblings. Toward the beginning of this investigation a sincere effort was made to get as much evidence as possible concerning each individual's family tree, but the search was disheartening. Only the subject's own word could be taken as evidence, and usually it could not be relied upon. Frequently one or the other parent was acknowledged to have exhibited signs of hypertension, and occasionally brothers or sisters were put in the same class; but the information was fragmentary and unreliable.

It must be acknowledged that, as in the case with tuberculosis, presence in several members of the family of like symptoms indicates the environmental situation more than true inheritance. The germ plasm cannot pass on more than a tendency for environmental factors to play upon. As far as can be judged, non-neurologic muscular hypertension is caused by conditions operating on the individual after birth rather than before.

Racial Factors. Any racial tendencies revealed in this study cannot be given significance. Many authors have referred to the nervousness of the Jew. It is to be remarked that some of the most severe cases in these records are Jews, but, when one observes that only twelve of the seventy-five individuals analyzed are of that race, the condition cannot be considered peculiar to them. Apparently residual neuromuscular hypertension is a respector of no race or creed and may be looked for in any individual who permits his body and mind to become overworked.

Summary of Causes of Residual Neuromuscular Hypertension. It is true that no one can say accurately how much of the nervous hypertension of an irritable adult "is due to faulty congenital factors and how much to general malnutrition or disease of his organism, or to habits and impulses resulting from past experiences of pain and suffering";[20] but from this study certain general hypotheses may be stated as to causes of residual neuromuscular hypertension.

(1) A person's general appearance gives no accurate information concerning the degree of residual tension in his muscles. Restless behavior and spasmodic movements are no more characteristic of tense individuals than apparent calmness and poise.

(2) Any posturing of a loosely articulated structure like the human animal will demand muscular tonus; any persistent static position held actively will result in residual tonic contraction. At work the individual should be protected from static strain by proper support. As a release for tonic contractions he should have occasional periods of movement as well as recumbency.

(3) Residual neuromuscular hypertension is no respector of body type, as revealed by height-weight relationships. The fat man as well as the thin man may be tense.

(4) As a means to better metabolism, pulmonary ventilation must be aided; and any natural activity in childhood or adult years which will increase the flexibility of the chest is to be encouraged.

(5) As far as endocrine functioning is concerned, this study offers evidence only on the effect of parathyroid dysfunction to calcium availability, calcium being essential for proper relaxation of muscle. Any final judgment as to the effect of other glandular conditions on muscular phenomena is left to future laboratory experiments.

(6) Conditions in the internal organs may

be said to have an effect upon the tension of skeletal muscle; while hypertension in skeletal muscle causes sufficient reflex spasm in smooth muscle to result in marked discomfort and dysfunction.

(7) No conclusions can be drawn from these records as to the effect upon muscular tension of infection or of drugs.

(8) Pain has been shown to be a concomitant of extreme neuromuscular tension. Anything which causes extreme residual tension will elicit pain; and, on the other hand, anything which causes pain will elicit reflex muscular spasms.

(9) Emotional strain has been acknowledged to be an important cause of neuromuscular hypertension, and evidence has been presented to show that when an individual lacks security of any kind he will reveal symptoms of residual tenseness. The tenseness appears to be a physiologic expression of the psychic disturbances.

(10) Overactivity, from whatever origin, has been shown to be the most common cause of residual neuromuscular hypertension in the cases analyzed. Since activity is partly influenced by environment and is subject to control, the implications for education growing out of this investigation will be more important than if neuromuscular hypertension were due entirely to individual idiosyncracy or temperament.

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(Editor's Note: This is the sixth and last of the series of articles by Miss Rathbone.)

The Physical Treatment of Spastic Paralysis

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The term "spastic paralysis" is used to denominate a group of conditions in which increased reflexes and varying degrees of spasticity are evident. Associated with the spastic state of muscles, there are a variety of tremors and other involuntary movements, ranging from twitching of muscle fibers to major choreiform movements and, occasionally, severe dystonic twists or torsions of the entire body. Phelps stated that of the many types, the athetoid and the spastic types comprise about 80 per cent of the total number of cerebral palsies and that the two are totally different from each other. From the physical therapist's point of view the nature of spasticity and athetosis must be determined. For purposes of treatment, however, spasticity may be said to be a hyperirritable condition of the muscle; that is, it will contract more forcibly than normally, no matter what stimulus is applied. Athetosis may be described as a series of involuntary motions which affect one muscle

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after another throughout the extremities without any particular order of contraction. The contractions may be rapid or slow and are entirely beyond the control of the individual.

Thus far, we have discussed motor activity. More serious, although less visible, is loss or impairment of those mental faculties which decide motor action. The vital point in successful treatment of any spastic child is more often the degree of mental development than of motor impairment. The mentality often is extremely difficult to evaluate, especially when physical affliction is severe and far out of proportion to intellectual ability.

In regard to deformities, Mead stated that the more common are the following: adduction, internal rotation, and occasionally, flexion deformity of the hip; flexion deformity of the knee, especially associated with the more severe grades of paralysis; equinus deformity of the foot, with a varying degree of varus; flexion deformity of the elbow and wrist and pronation of the forearm; flexion of the fingers to a slight or extreme degree, even to the extent of cutting the skin of the palm with the finger nails. Nearly all deformities, if neglected, finally, will become complicated by shortening of the muscles and tendons causing the deformity. The contractures and deformities caused by shortening of the muscles and tendons are outstanding physical defects and effort must be made to stretch these shortened groups before any great degree of success can be attained.

The problems to be overcome in treatment of the spastic child are many. Sometimes, the intelligence is obscured by inability to control muscular movements to such an extent that the child is regarded as mentally defective. We cannot rely too much on intelligence tests, because the majority of them require use of muscles, over which the patient may have little or no control. As an arbitrary standard, however, such tests are useful in serving as a starting point. If the child has a fair mentality; that is, if he possesses an average or a little less than average intelligence quotient, much can be done by proper vocational and scholastic training. Within his mental and physical scope, the individual may be enabled to become partially self-supporting, even to the extent of sustaining himself in industry, if this is necessary. If the intelligence quotient is hopelessly low, it is of little use to treat him. The emotion of fear plays a major part in the life of the cripple; fear of physical discomfort, fear of falling, fear of being misunderstood, all are important factors. Owing to his inability to cope with physical conditions which surround him on every hand, this emotion is more than justified. He spends his days face to face with difficult situations in which fear, nervous strain and ineffective physical exertion place him out of tune with his surroundings.

If the spastic child does not undergo treatment and training from the earliest possible time, the family, as a rule, will become so accustomed to pampering the individual that reconditioning is extremely difficult. Often the parents are lenient with him and, should he not have his way, it does not take much effort on his part to appear more nervous than usual; thus, invariably, he persuades them to give in to him. If such situations are not met with proper discipline in early life, a maladjusted personality is bound to develop. If the individual has been deprived of early training and proper guidance, habits of faulty motion must be unlearned. Carlson[3] stated that the problem of the child injured at birth is not merely orthopedic in nature; it is an educational problem in itself, which, for its solution, demands close coöperation between physician, teacher, and parent.

PURPOSES OF TREATMENT

The general aims and purposes in treatment of spastic patients, according to Lowman are: (1) sedation of sensory nerves, (2) localization of control and coördination, (3) mental training (that phase involved in physical effort), (4) reduction and prevention of contractures, (5) improvement of balance and locomotion, and (6) physical adjustment to environment.

The primary objectives in treatment of spastic paralysis are prevention or correction of deformities and teaching of relaxation and coördination through a well rounded educational program (including academic work and well planned exercise), which will bring about, simultaneously, mental growth and improved muscular coördination. Time and effort spent in training muscles, which do not interest and stimulate the child definitely makes that child conscious of his muscles and retards general improvement. Both mental and physical growth can be brought about best by developing the assets possessed by each individual.

AVAILABLE PHYSICAL THERAPEUTIC MEASURES

Radiant heat.—The chief value of radiant heat is to produce relaxation when given for

periods of ten to fifteen minutes. Longer sessions are irritating to children. In most clinics, heat is not used except in extremely cold weather.

Diathermy.—Deep heat is not recommended generally, because spastic patients, as a rule, have no marked circulatory disorders.

Sinusoidal currents.—Generally, sinusoidal currents are not used but, if the tone of the muscles has been determined by careful testing, theoretically, the flaccid and weak muscles might be stimulated to contract.

Ultraviolet.—Carlson[5] is of the opinion that ultraviolet light is detrimental, because such rays are known to increase the tone of muscles, but he has found that when the children are transferred to a southern climate, the general benefits from the sun's rays far offset any deleterious effects occurring prior to acclimatization.

Massage.—Movements should consist of slow and even stroking, continued with gentle kneading of the hypotonic muscles. The contracted muscles are stroked lightly and rhythmically to relieve hypertonicity.

Hydrotherapy.—It is Lowman's opinion that exercises in warm water are good for certain cases, because such a procedure induces general relaxation, sensory sedation, training in control of muscles, and is of psychologic benefit. Patients, too, are handled more easily and are observed more accurately. Opposing this view, both Girard and Carlson feel that the ability to relax is not satisfactorily prolonged after hydrotherapy because such treatments are too exciting. Also, the athetoid type of patient and the patient who has a low mentality are unsatisfactory cases for such therapy.

PROGRAM OF TREATMENT

Examination of muscles.—For purposes of treatment, examination of muscles is as important as the intelligence test. An examination similar to that used in cases of infantile paralysis may be performed on spastic patients; but the findings are charted as spastic, normal, or flaccid, instead of according to the various degrees of strength, as is the custom in examination of patients who have poliomyelitis. After this examination has been made, treatment may be carried out on the basis of these findings.

Relaxation.—To most people, the word "relaxation," used therapeutically, means conscious relaxation. This procedure is important for the child who has cerebral palsy and he should be taught to relax for short periods of time through conscious effort. The word is used, also, to describe that kind of relaxation which should be maintained throughout the day. This form of relaxation can come only from a feeling of well-being through physical comfort, security, and contentment. When the spastic child enters upon his training of muscles and gait, half the batle is won if the instructor can induce the patient to relax; herein lies the secret of training the extremities toward better coördination and function. The technician must exercise constant ingenuity, resourcefulness, and patience in teaching the patient to do simple, automatic things without becoming tense and excited. He must be taught to do, unrestrainedly and slowly, those things which he can do and must be led, at an easy progression, to performance of more difficult or complicated acts. "Trying hard" slows up or prevents action and induces apparent muscular tremors in a spastic child. As relaxation probably means nothing to the patient, the instructor may give commands which are more intelligible to the child such as "let go," "feel soft," "feel loose." Also the instructor may pick up one of the patient's hands and, if it does not fall limply, he may tell the patient that the hand is not yet "asleep." Soft music is always a good accompaniment during periods of training because music occupies the child's mind, distracts his attention from the effort, and, at the same time, soothes him. After a sufficient period of quiet, the exercises for muscle training can be started, slowly and quietly, while the music continues. After the child is relaxed, the activity can be continued in rhythm with the music, thus attaining coördination more readily.

Relaxation is the important part of treatment of the athetoid patient. To accomplish good results it is necessary to begin treatment by concentrating on the proximal rather than the distal joints and then gradually work distally. Not to be overlooked in the establishment of relaxation is the beneficial effect of exercises in a pool of warm water. The warm water relaxes the muscles and the factor of buoyancy aids in the exercises.

Treatment of contractures.—As contractures are the outstanding muscular defect, effort first must be made to stretch these shortened groups before any success can be attained through training in coördination and motor skill. Contractures, if neglected, finally will become complicated and will tend to increase

deformities. Exercises consisting of easy, rhythmic swinging of the contracted parts are used for relaxation. Swinging, in most instances, should be in a direction that will loosen or produce easy stretching of the contracture. The limb is swung from the starting point as far as the contracture will permit, then back again, effort being made in every instance to increase the amount of motion.

Exercise.—With respect to the specific types of exercises, it is very difficult to give any set rules, because exercises must be adapted to each individual case. Passive, active, and resistive exercises are used in the various stages of treatment of the spastic child. It is best to have the first exercises done passively by the instructor, because any effort on the part of the patient, at the beginning, immediately throws the extremities into incoördinated movements. Active exercises are useful because of their very definite action on the neuromuscular apparatus. Coördination of muscles can be brought about only by repeated, purposeful movements initiated and executed by the patient. The value of resistive exercises lies in the physiologic fact that, during the action of the weak group of muscles, inhibiting impulses are directed toward the spastic group, thus tending to lessen activity of that group.

Carlson stated that the primary aim of exercises was to teach patients to make an active movement with a minimal amount of muscular effort. Exercises should be carried out with the least possible amount of overflow, that is, with as little effort as is required to produce free and easy movement. It should begin with slow, coördinated, rhythmic forms of exercise, starting with the large proximal groups of muscles, such as those controlling the shoulder and the hip. The aim should be to include, gradually, exercises for the knees and elbows and, finally, for the hands and feet. Control of the large muscles of the body should be acquired first; then, control of the smaller groups should be acquired.

Exercises in a pool demand a different program. Positions in the water, resistance, buoyancy, heat, and surroundings, all are factors in determining the difficulty of the exercises.

Mechanics of the body.—In an attempt to better the condition of the handicapped child, it has been shown conclusively that faulty mechanics of the body increase the handicap and that improvement of mechanics of the body lessens it. Children who have cerebral palsy tend to assume, in their early years, lying, sitting, and standing postures which prevent development of a tall, straight, normal body.

In addition to contractures caused by the primary lesion, these habitually poor postures unnecessarily cause secondary contractures of muscles, which should be prevented. According to Rogers and Thomas the outstanding examples are contractures of the muscles of the thorax, which tend to narrow the thorax and tend to pull the shoulders down and forward. Inward rotation of the arms accompanies this deformity. Also, the characteristic forward position of the head causes the chest to drop, favoring contraction of these same muscles. These poor postures of sitting or walking, soon become habitual. As soon as the child gains the slightest confidence or control in balancing himself, he can be helped by training which will bring about improvement in the mechanics of his body.

Muscle training through play and games.—Through the stimulus of play these children are able to make motions far more accurately than when they try to make the same motions on direct command. Games afford the happiest moments of the day. Almost every game must be adapted in some way to these children. Particularly, simple games and rhythmic games are of value. Many of the games are changed beyond recognition, but this, in no way, decreases the joy and good spirit of the games. Games creating too much competition, tests of skill or strength, running, and the usual excitement which accompanies certain types of games are to be avoided. Such activities are not necessary because they have no prolonged value.

Selection of toys, furniture, and apparatus.—Each toy should be selected for its therapeutic value. The first principle is to make certain that the child will not be discouraged by finding the toy too difficult to handle. He should have on his table the type of toys which best fit his need for exercises of the arm and hand. Orthopedic apparatus, such as walkers, should be designed and made for the individual child. Chairs should fit him and should be padded, when necessary, to make him comfortable.

Staleness.—All the leading medical authorities on spastic paralysis agree that staleness is likely to develop if patients are overtreated. In most cases, it is unwise to have the patient perform exercises more than an hour a day.

If a child tires of the exercises, he should not be forced to continue, but should be given a rest from such treatment for a period of time ranging from one to two weeks. It is also customary to give children a vacation of one or two months each year to avoid this tendency toward staleness or lack of interest.

TRAINING PARENTS IN HOME TREATMENT

Parents who find themselves faced with the responsibility of rearing a spastic child must resign themselves to this difficult task by adjusting their lives to that of the child. If they strive to meet the situation with patience and calm, they will derive more happiness than by endeavoring to find an easy escape, or by taking refuge in false hopes. The more severe the handicap, the more the child will need the parents' strength, courage, and cheerfulness. The parent must be teacher, playmate, and physical therapist. The attitude of the parents will be reflected in the child. The mother, especially, must exert herself to make the child independent within the home and must give him every opportunity to utilize, in many practical ways, the control he has gained through care and training, rather than shield him by inculcating in him an attitude of dependence. The parents should try to direct into other channels the child's overflow of accumulated energy which interferes with his muscular control. Use of games, toys, and activities are important in furnishing a direction and outlet for this energy. The parents always should encourage the child in his efforts and try to allay his fears, yet, at the same time, they should not allow the child to overdo any of the exercises or games.

The instructor in charge may advise the parents on the proper exercises and treatment which can and should be carried on at home. The parent should not be in a hurry, under tension, or bothered with other duties when giving instruction. The same hour each day should be set aside for treatment. The room should be quiet, warm, and free from outside influences.

However, muscle training for these children should not become just a matter of an hour's intensive exercise each day. With understanding, thoughtfulness and patience, muscle training can be carried on throughout the day without fatigue. Achievement brings much satisfaction to the spastic child. It is a real accomplishment for a child who has poor motor coördination to be able to wash his own face and brush his teeth. The most seriously handicapped child will attempt, with great glee, to hold the wash cloth and to use the soap. Usually, he succeeds in some measure. The same principle applies in allowing the child to dress himself, as far as possible. Dinner can be served and eaten in twenty minutes if the child is fed by someone. It might take more than an hour if he were allowed to feed himself and would probably take endless patience and perseverance on his part, but it would be worth the time both in muscle training and in fitting the child for later adjustments. Rogers and Thomas give an example of a girl, aged two years, who had one very skillful hand and one that was very poor. She refused to use the poor hand except during the formal period of exercise. However, when given her doll's clothes to wash, a tub of water, a clothesline and toy clothespins, the washing was soon flapping in the breeze and had been hung up by two hands. In short, the mother must see which movements the child needs most; then she can adapt games, toys, exercises, and daily activities to the child's particular needs.

COMMENT

Treatment of these patients represents the teaching of various skills. (Skills are taught by specialists in various fields, such as in art, music, and sport, as well as medicine.) Therefore, it is necessary to carry on treatment, from a medical standpoint, under the direction of a sympathetic physician and a thoroughly trained technician. The number of treatments given and the amount of time devoted to practice of the exercises should be gauged to some extent with the thought in mind that these patients are taught various skills. Intelligent coöperation of parents is essential for successful management of such cases. Both patient and parents should be instructed. The best books for instruction of parents, now available, are by Girard, Rogers and Thomas, and Fischel. A period of careful instruction by a skilled technician may prove of inestimable value to patient and parent alike, in solution of the difficult problem of treatment of the spastic child.

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The Place of Physical Therapy in Schools of Nursing

May Sara

The New York State Board of Nursing requires sixteen hours of practical instruction in massage. There is no attempt, however, to make nurses proficient in this length of time. They are given just enough instruction to enable them to do their duties more acceptably to their patients. Their hands must be trained and made sufficiently supple to enable them to massage patients properly. They are taught to administer movements either to stimulate or to soothe the patient according to his needs. They are taught to use the right hand on the right side of the limb and the left hand on the left side. They must relax patients who are suffering from fractures and assist in making the numerous surgical and medical cases more comfortable. They must know when and why massage of any description is advisable or the reverse. Each student nurse must see, do and feel the different manipulations in order that she may understand just how much can be endured.

The student nurse must endeavor to persuade her patient that:

"Rest is not quitting a busy career
Rest is fitting self for its sphere."

The students' interest should be stimulated by giving them responsibility in individual cases. One very interesting case was a fractured patella—an open reduction. Each morning this man was brought up for treatment to the physical therapy department. The student who came up with him was at the time taking her course in massage. By watching the result obtained from physical therapy, it was impressed upon her the need for her cooperation in giving additional massage and movements each evening. This she did, with the result that we obtained normal flexion and the patient was discharged from hospital much earlier than the doctor anticipated. Great credit was due to the student for without her assistance this could not have been accomplished. Another case was a fracture of the humerus. Again, with the cooperation of two student nurses, we were able to regain strength and flexibility in a short space of time.

If it were possible for training schools to arrange their curriculum so that every student might have the opportunity of observing the results of treatment by the various forms of physical therapy, they would be better able to understand the importance of their part in the care of the patient.

In conclusion, I would suggest:

1. That it be arranged for the physical therapy department to hold at least six clinics for the student nurses for observation in addition to their sixteen hours of massage.

2. That the physical therapy department should endeavor to have its most instructive cases on the days of the clinics.

3. That the technicians should cooperate by devoting their time in explaining the aims of physical therapy.

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The 1938 Convention

Are you beginning to think of that precious vacation month this summer? Surely this is the year to come to New England! Start in time to attend the 17th annual convention, June 26-30, at the Hotel Somerset, Boston, Massachusetts.

Boston in itself has much of interest to offer. It is an old community founded over three hundred years ago by colonists who were willing to sacrifice all for a great ideal. No other city on the continent has so many points of historic interest within easy walking distance as has Boston. Pre-revolutionary Boston was a village; consequently its environs were not far-flung, and if you have an hour's time at your disposal you can see many of these things which have been famed in song and story and which both date and antedate the Revolution.

Metropolitan Boston is one of the first educational centers of the world. In 1635, five years after the coming of the Puritans, there was established in Boston the first free public school in America. This is now the Public Latin School in Boston. The next year Harvard College was founded at Newtowne, now Cambridge. These were the first institutions of their kind within the present limits of the United States. In 1644, an elementary school for teaching the three R's was established in Dedham. This was probably the first school built and supported wholly by taxation in the United States.

The Boston Metropolitan area probably leads in the number of period houses secured for preservation and open to the public. Many are owned and occupied by descendants of the original builders and have been handed down from generation to generation. Over the thresholds of these homes have passed men and women whose names are linked with important events in our nation's history, and whose descendants followed the Mohawk Trail, and later the Erie Canal to settle in Western New York, the Middle West and the vast expanse of the far West.

The widest range of styles is covered by these interesting structures. The earliest building is the Fairbanks House, 1636, in Dedham, and conceded to be the most picturesque house in America. Probably one of the most accurate restorations of a seventeenth century house in America is The Old Browne House, 1663, in Watertown; while none surpasses in excellence the wonderfully preserved "Scotch"—Boardman House, 1651, in Saugus, awaiting restoration. Also historically interesting is the Ironworks House in the same town, dating from the 1640's which with the "Scotch"-Boardman House, is associated with the earliest ironworks in America.

For an eighteenth century building there is the Wayside Inn at Sudbury; and what memories of the Revolution and of the early republic are enclosed within the walls of the birthplaces of the two Adams presidents in Quincy? The aristocrats of the houses of this period may be studied in the Dorothy Q. Homestead at Quincy, the Royall House in Medford, or the Vassall Mansion in Cambridge, which was Washington's headquarters during the siege of Boston and later was Longfellow's home.

The Charles River Basin, within a few blocks of our convention headquarters, is a beauty spot and playground in the heart of the city. Go for a ride at sunset on one of the boats that make frequent trips around the basin if you would appreciate its charm. If you like boats and want to fill your lungs with salt air, plan to take one of the numerous trips down the Harbor, along the North and South shores or as far as Provincetown. It is not far to Cape Cod with its own South Sea atmosphere or to Gloucester on Cape Ann and the artists' colony at Rockport.

Then if you wish to go farther afield, do

you know Maine's rocky coast and the good fir balsam fragrance? Or do you prefer mountains such as New Hampshire offers with her White Mountain range? Every New England state has its own special claim to being the place where you can have the best vacation ever. But first we would like to welcome you to the America Physiotherapy Association Convention!

TENTATIVE PROGRAM FOR 1938 CONVENTION

Sunday—June 26

3:00 p. m. Registration.
6:30 p. m. Supper at Wayside Inn—"As ancient is this hostelry as any in the land may be."

Monday—June 27

9:00 a. m. Address of Welcome by Dr. Robert Osgood.
9:30 a. m. Business Meeting.
2:00 p. m. Clinic at Robert Brigham Hospital. (A hospital devoted mainly to the treatment of chronic conditions with special emphasis on arthritis.)
7:00 p. m. Lectures (to be announced later).

Tuesday—June 28

9:00 a. m. Lectures (to be announced later).
2:00 p. m. Visit Industrial School for Crippled Children—"First school for crippled children in United States." See volley ball played on crutches.
7:00 p. m. Banquet.

Wednesday—June 29

9:00 a. m. Business Meeting.
2:00 p. m. Lectures (to be announced later).
8:00 p. m. The Pops (one of Boston's oldest "institutions"—a favorite gathering place, during May and June, where people may meet informally to hear classical, light classical and popular music played by 85 members of the Boston Symphony Orchestra).

Thursday—June 30

9:00 a. m. Visit Bader Building, Children's Hospital Physiotherapy Department, including the pool and the Neurological unit; also Harvard Infantile Paralysis Commission Clinic.

Chicago Chapter

The Chicago Chapter sponsored a series of six lectures on orthopedic subjects. Dr. Philip Lewin spoke on "Manipulative Surgery," Dr. Edward L. Compere on "Anterior Poliomyelitis," and Dr. Howard Hatcher on "Tuberculosis of the Skeleton" and "Non-tubercular Arthritis."

Under the auspices of the Chicago Chapter, the Visiting Nurses Association of Chicago will hold an exhibit at the meeting of the Illinois Medical Society in Springfield, Illinois, May 17 to 19. This is the same exhibit which was shown at the 1937 annual meetings of the American Medical Association and the American Congress of Physical Therapy.

Ohio Chapter

On January 30, 1938, the Cleveland District of the Ohio Chapter entertained Dr. John S. Coulter at a tea and reception. This was held at Lowman House, University Hospitals, following his lecture which was given at the Academy of Medicine under the auspices of the Holden Foundation.

The first number of the News Bulletin of the Ohio Chapter was mailed out during the middle of February. The editorial staff consists of the following: Editor, Lois Ransom; Associate Editor, Betty McMillen Rhea; Reporters, Ruth Pratt, Lois Berry Young and Martha Kearney.

The third annual meeting of the Ohio Chapter will be held in Columbus, April 6 and 7, in conjunction with the annual meeting of the Ohio Hospital Association. Headquarters will be at the Deshler-Wallick Hotel.

Dr. Albert Steegman, Instructor in Neuropathology at Western Reserve Medical School, and Director of Physical Therapy at University Hospitals, will deliver the following lectures at the University Hospitals Amphitheater under the auspices of the Cleveland District:

Anatomy and Physiology of the Neuro-Muscular System
Classification and Clinical Features of Neuro-Muscular Diseases
Pathology and Pathologic Physiology of Neuro-Muscular Diseases
Electro-Diagnosis and Treatment of Neuro-Muscular Disorders

Western New York Chapter

Mrs. Anne Williston Rieck, member of the Western New York Chapter, has recently been appointed instructor to assist Doctor Martin in the physical therapy course given at Buffalo University, Buffalo, New York. Previous to this appointment Mrs. Rieck taught physical education in the Day School for Crippled Children at Buffalo City Hospital and also worked part time at the Buffalo General Hospital.

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ABSTRACTS

John S. Coulter, M. D.

Physical Therapy of Peripheral Vascular Disease

Beverly Chew Smith, M. D., Assistant Visiting Surgeon, Presbyterian Hospital, New York. Arch. Phys. Therapy, 8:7:391 (July) 1937.

I am firmly opposed to the use of machines to which patients have to be adapted. This is a dangerous principle. A pressure-suction apparatus which cannot be adjusted to the patient's tolerance should be rejected. We employ boots in which the duration of the positive and negative cycles can be changed from ten to sixty seconds. This varies the number of cycles of pressure per minute. Besides this cycle change the pressure of each positive or negative phase can be regulated from zero to 120 mm. of mercury. Cycles for individual patients need changing during a treatment. If improvement takes place, they usually can stand higher pressures for a longer time. An extremity should show a pink to red blush, an alternate filling and emptying of the superficial veins, and either a cessation or a definite decrease of pain to indicate beneficial effects. If these changes are not evident, there is a real danger in the administration of intense dosage. Increased ischemia with skin necrosis or actual additional thrombosis of the larger and smaller superficial arteries may occur.

The use of multiple outlets up to four boots from a single pump is of questionable value, as all patients do not have the same degree of circulatory impairment so that pressure and cycles which may be the optimum for one may not be so for another. As a matter of fact, different pressures and cycles may be indicated even for the two legs of one and the same patient.

Effects of Pressure-Suction

Open granulating wounds without residual exudate, if subjected to proper pressures and cycles, will heal more rapidly. Serum sometimes exudes from the granulations without bleeding, and if appropriate surgical dressings to prevent scab formation and retention of pus are applied between treatments, pressure-suction therapy will prove beneficial.

Following the diathermy treatments the temperature of the toes returned to pre-treatment levels in 15 to 20 minutes, while with the whirlpool baths the temperature of the toes remained elevated one to four degrees for one to two hours. This latter treatment in conjunction with massage keeps the skin soft and free of minute excoriations which are portals of infection. Callosities are softened and yield more readily to appropriate treatment, fungous infection is lessened, patients become conscious of foot cleanliness and last but not least, the treatment is more economic. For these reasons whirlpool baths have replaced diathermy in our clinic in the care of peripheral vascular diseases. If patients can withstand transportation these treatments are given in the physical therapy department, otherwise a portable apparatus is used at the bedside.

These baths in conjunction with massage, given three to four times weekly, have afforded better symptomatic relief in thromboangiitis than the pressure-suction boot in the small group of cases in which they were used. Pressure-suction therapy will have to be tried more extensively before it can be evaluated for thrombo-angiitis obliterans. It has caused pain at minimal doses, has not relieved pain at maximal doses, has not decreased intermittent claudication, has exacerbated local infections and ulcerations with less color and venous changes, and has caused or aggravated phlebitis, and ultimately has saved fewer extremities with thrombo-angiitis than was attained in the arteriosclerotic group.

Use and Abuse of Sun Bathing in Tuberculosis

In The Journal of the A.M.A., 110:1:82, Jan. 1, 1938.

Hudson states that the sun is a powerful means of treating certain disorders, especially beneficial in cases of surgical localized tuberculosis and certain other chronic surgical conditions not necessarily tuberculous. Patients

with pulmonary tuberculosis never should be allowed to take sun baths, as they definitely are dangerous. But sun bathing may be prescribed when tuberculosis approximates the surgical type, being quiescent and localized, and in chronic pleurisy. Indiscriminate sun bathing certainly can light up an unsuspected, latent pulmonary focus. Sun treatment consists in the gradual exposure of the body to the light, not the heat, of the sun, and patients who are taking sun baths should be surrounded by a proper circulation of free air. Sun treatment always should be supervised and controlled by a medical practitioner. The aim of sun bathing is not burning but pigmentation. When tuberculosis is of the scattered type, and especially if the patient shows a liability to fever, either periodic or continuous, or a tendency, on exertion, to autoinoculation, exposure to the sun should be strictly avoided, as it is likely to precipitate actively the spread of the condition. Sun bathing may be tried as an additional stimulus when a patient whose progress is slow is becoming cured.

Physical Therapy Department in Small, Medium and Large General Hospitals

John S. Coulter, M. D., Chicago. In Hospitals, 11:12:54, Dec. 1937.

The Manual of Hospital Standardization of the American College of Surgeons states:

"The director of the department of physical therapy should be a physician who has had special training in this branch of work, as well as extensive clinical experience. This is essential, not only for the safety of the patient, but the carrying out of scientific treatment. . . .

"The department should have the necessary corps of trained technical staff. Physical therapy technicians or aids require a basic knowledge of anatomy and physiology in order to understand the application and effect of the various types of treatment. Well trained technicians are invaluable, not only in carrying out treatment ordered, but in observing and reporting symptoms and reactions to treatment. They should always be under the supervision of a medical director.

" . . . It is important that the medical director have full authority in regard to treatment, inasmuch as physical therapy has become an intricate specialty in the last few years, and all doctors practicing medicine today are not sufficiently familiar with the various forms of therapy to assume the entire responsibility of prescribing the most desirable type of treatment."

Physical therapy is now so well recognized that it is recommended to the American College of Surgeons that their manual of hospital standardization under the section of physical therapy should add the following sentence at the beginning of the section: "An efficient physical therapy service should be available for every approved hospital."

Dr. Philip Wilson recently stated: "I look to the more general and intelligent use of physical therapy, not by physical therapists but by physicians, as the means of making the next great advance in fracture treatment." Many other experienced students of fractures such as Magnuson, Cotton, Darrach and Murray have written on the value of physical therapy in fracture treatment.

In view of these statements it is believed that in the Manual of Hospital Standardization and under the section on Traumatic Surgery it should be recommended as a part of the Minimum Standard that physical therapy should be available in hospitals treating fractures.

Summary

In conclusion it is emphasized that every hospital needs some physical therapy, that a hospital physical therapy department needs trained personnel more than equipment and that the recommendations in the Manual of Hospital Standardization should be followed in the organization of the physical therapy department.

Set-Up for Physical Therapy

Helen L. Kaiser. Mod. Hosp. 49:4:56 (October) 1937.

No mention has been made of equipment for hydrotherapy. Unless there is definite assurance that it will be used sufficiently the expenditure is not warranted. All equipment should meet the standards of the Council on Physical Therapy of the American Medical Association.

Whether or not a physical therapy department is self-supporting depends on the type of patient treated. In establishing fees it is well to remember that treatments usually average three a week and frequently are of extended duration. The average fee throughout the country is from $3 to $5 a treatment. In this section of the Middle West we have a tendency to charge too little for this time-

consuming service. An equitable solution commensurate with the service given would be to establish a basic rate of $2 (there would be exceptions to this), and an additional charge of 50 cents for each modality added. At this rate a department carrying as high as 50 per cent service cases can be self-supporting.

Records are frequently neglected in physical therapy. All physical therapy treatments and progress notes should be charted on the patient's medical record. This record should always accompany him to the department so that the entire history is available and proper charting of each treatment can be made. For department records and reports it is expedient to keep a day book in which each treatment is recorded.

Regardless of equipment, a department cannot succeed unless it has an adequately trained staff. Adequately trained staff does not mean a nurse or a technician who can turn on switches only.

Salaries for the physical therapy technician should be comparable to other professions requiring an equal amount of preparation and should range from $1,400 to $3,500 a year, depending upon the size of the community, department and the amount of responsibility. Vacations of one month are essential, for the work is not only strenuous but exacting and nervously exhausting. The average daily schedule should not include more than twelve or fifteen cases for one worker in order to obtain the best results.

Treatment of Spastic Paralysis

F. H. Mills, M. B., B. S., (Formerly Tutor in Medicine, St. Andrew's College, University of Sydney) in British M. J., August 28, 1937.

General Treatment

The general health is supervised and adequate food and rest provided. The patients are told to rest from 2 P. M. to 4 P. M. and to get plenty of sleep at night. If of school age they do not attend school but are given lessons at home by the mother or else take a correspondence course. School is forbidden because the spasticity is likely to increase in front of others; the awkwardness of their movements often excites jeers from other school mates; they become nervous, their awkwardness increases, and they suffer psychologically.

Inhibition of Muscular Spasm

The first essential of treatment is to inhibit the muscular spasm. A warm bath at a temperature of 37° C. is given at the start of treatment. This is a necessary preliminary in any form of education of spastic muscles. The patient is asked to relax and breathe deeply. At the same time the affected muscles are gently manipulated. This stimulus is a powerful inhibitor of muscle tone. It is important to remember that the most proximal muscle groups of a limb which is in spasm (the deltoid and pectoralis major muscles, etc., in the upper extremity) must be inhibited first; thus the receptive fields are avoided. The muscle groups are treated proximodistally in succession until they relax, the manipulations being as gentle as possible, especially when the distal receptive fields are approached.

These gentle stimuli cause a state of inhibition of the spasm and what is called the inhibitory after-period develops. The period is gradually extended as treatment proceeds and generally becomes permanent—that is, conditioned. During this inhibitory phase the muscles may be stretched without evoking the stretch reflexes. The attendant then passively moves the joints, starting very gently with the most proximal joint. At the first sign of return of tone the muscle is again inhibited and the joint again put through a complete range of movement. These movements must be very slow and the patient's attention should be concentrated upon them, the attendant saying, "I am abducting the shoulder," or "I am adducting the shoulder." By this attention training, the proprioceptive sensations are reinforced and sensory re-education takes place. The patient's mind must be made to follow the movements of the joints and be educated by these movements. The extremities educate the brain. New nerve pathways are opened up and proprioceptive sensation will slowly return. It is essential, however, that with each passive movement the attendant secures the absolute mental co-operation of the patient.

Special Exercises

Quite apart from the ordinary relaxation exercises, in which the patient is asked to relax or to take a deep breath and relax, deep breathing and sighing exercises are helpful. In another exercise the muscles of the limb are loosely hunched up and released, starting at the shoulder girdle and proceeding down to the fingers. If when the fingers are being

moved the muscles of the forearm become spastic, the patient is told to relax and the dorsum of the hand is percussed lightly with the attendant's fingers.

The lack of balance, very noticeable in this condition, is to some degree overcome if the attendant can induce the patient to recognize contact between the sole of the foot and the substance of the ground or floor. For this reason in all walking exercises coir matting is used, so that the proprioceptive stimuli will be reinforced by increased cutaneous impulses. Stability is obtained by teaching the patients to climb steps. The weight of the body is forced on to each foot alternately with the patients concentrating all their attention on each movement. Long perseverance in this step climbing will eventually result in the linking up of the physical balance and mental control. Specially constructed steps covered with coir matting allow the attendant to supervise every movement and give the patient greater confidence.

Exercises in Co-ordination

The patient, lying down, is asked to place the heel of one foot on the opposite knee, guided by the assistant if necessary. The movement must be slow and purposive, but the patient must remain relaxed. The child is directed to place his foot in the assistant's hand, which is moved to and from various positions until practically every muscle in the lower extremity has been brought into play. Similar controlled movements are practiced with the upper limb. No rhythmic movements or quick cyclic movements are ever attempted.

Suction Pressure Treatments in Impaired Circulation of the Extremities

Lucy Hobson, B. S., Technician, New York City. Northwest Med. 36:10:342 (October) 1937.

We treat cases of arteriosclerosis, thromboangiitis obliterans or Buerger's disease, frostbite, sprains, fractures after removal of cast, amputated stumps and varicose ulcers of long duration with satisfaction and increasingly good results. Arteriosclerotic patients respond very well to suction pressure treatments. We have cases coming in the hospital with a history of cyanotic toes, pain on walking, and walking restricted to a block or less.

How do you know how much negative and positive to give a patient? There are three factors that enter into the adjustment of suction pressure machines; first, the amount of suction and pressure in mm. of mercury; second, the duration of the total cycle; and, third, the duration of the split cycle. Any equipment, to be acceptable for use, should permit adjustment in regard to all three factors.

Time. No set rule exists for the ratio of the split cycle; that is, the ratio of suction time to pressure time, but from my experience one should adjust the suction and pressure gradually until adequate color changes appear. This indicates that on suction (negative pressure) a sufficient quantity of blood is being brought into the extremity, and that on pressure (positive pressure) the peripheral vascular bed is drained. However, experience shows that in fracture wards, in which the cases are less apt to show pathologic vessels, the color changes will be dramatic and much less negative than positive pressure will be needed to draw adequate blood into the extremity. In these cases a more rapid cycle will be sufficient.

In diabetic cases we also use a rapid cycle and a ratio of about one part pressure to four parts suction, or even greater at times, and according to the individual case.

In sclerotic cases the cycle is considerably longer and more suction than pressure is applied; in these cases the suction is used to its greatest extent.

In general, adjust the negative and positive pressure according to the color changes produced. You usually can see the veins fill and empty with the alternating suction and pressure. When in doubt, take nothing on yourself. These cases are too serious. Consult the physician in charge of the case or the service on which you are working.

Summary

Suction pressure is an accepted method of treating vascular diseases.

There is value in detecting the vascular cases early. Technicians can help.

Skin temperatures and oscillometric readings are valuable tests in peripheral vascular work. Note all pulses of lower extremities.

Tobacco has a strong effect upon circulation and should be discontinued.

Know the technic of applying, removing and adjusting the apparatus.

Individualize as to patient's cycle and amounts of suction and pressure on each case.

Close attention to the finer details in technic is imperative.

Fractures of the Upper End and Shaft of the Humerus

Donald Gordon, M. D., New York City; in Am. Jour. of Surgery, XXXVIII:3:495, Dec. 1937.

To restore shoulder function due to a fracture of the shaft or upper end when the patient can get out of bed or is ambulatory, proceed as follows:

Have the patient bend forward with the injured arm hanging vertically to a point easily tolerated by the shoulder. Then with the muscles relaxed move the body so that the arm is set swinging as a pendulum, forward, backward, sideways, then in a circle with the clock and against the clock. This stretches the muscles. This is followed by making the same movements actively, slower than the pendulum time with the body at rest, which makes the shoulder muscles do work; that is, resisted motion in a position where gravity is overcome and which aids coordination. Later graduated weights can be held in the hand while doing these exercises. As function increases the body is bent forward until the shoulder is performing at a point of marked upward extension of the arm. Be sure that the movement takes place in the scapulo-humeral joint and not in the scapulo-thoracic joint. The first has a protective reflex mechanism which splits against any pain by spasm. The latter has not this mechanism and most of the movement of an injured shoulder is scapular, until the surgeon and time correct this.

Where pain persists in the shoulder, hot stupes daily will give relief. For the loss of elbow function in shaft fractures, the above exercises are needed, to which is added resisted flexion, extension, pronation, and supination of the forearm. "Climbing the wall" will be most commonly done with a fixed shoulder by means of scapular action which should be avoided. It is good only to measure return of the shoulder function. With a high pulley through which a rope is passed with handles attached to the ends, the well hand can pull up the injured one for stretching the abductors, but do not have the injured one pull the good one up. The adductor muscles are already strong enough, contracted, and need stretching.

As function is developed and strength is gained, a weighted or elastic wall exerciser can be used to resist every normal movement of the upper limb by simply changing the position of the patient's body to the device.

The Treatment of Pneumonia in Children

Joseph K. Calvin, M. D., Chicago. Illinois M. J. 72:5:406 (November) 1937.

Hydrotherapy is at times a valuable adjunct. A fever that is not unduly high needs no reducing, as it is probably a valuable part of the normal mechanism for combating bacterial invasion. As we all know, a high fever in pneumonia is a better sign than a low fever. If, however, the fever produces restlessness, lack of sleep, discomfort, delirium or convulsions, or there is hyperpyrexia, then measures may be instituted to reduce it. Sponging with tepid water and alcohol really has little effect on the fever, although it may refresh the patient. It may, however, subject the child to unnecessary handling, chilling and exposure. The Priessnitz, a light, tepid, wet flannel jacket about the body, enclosed in oilsilk, will often remarkably quiet a restless delirious patient and thus avoid other sedatives. It should be kept moist with tepid water. It can be left on indefinitely if the child falls asleep, as it soon takes on the temperature of the body and eventually drys out. An ice bag can be placed on the forehead, although most children fight against this. For extreme hyperpyrexia, cold packs and cold enemas may be used very cautiously.

Peripheral Vascular Disease

Abstract in J. A. M. A. 109:14:1158 (Oct. 2) 1937, from New York State J. Med., 37:1387 (Aug. 1) 1937.

Tenopyr and Shafiroff constructed a simple suction device for the treatment of peripheral vascular disease. The apparatus can be assembled easily in any hospital and can be used more generally by the profession with the knowledge that the same physiologic benefits can be obtained as with a commercial pattern. It consists of the regular portable suction machine used for surgical aspiration connected to an airtight chamber or boot by rubber tubing. Before the extremity is inserted into the boot, a properly fitting nonconstricting rubber tube encircles the leg or thigh. These tubes resemble in appearance the inner tube of an automobile tire and are of various sizes. The extremity encircled by its inflated tube seals the proximal end. The outlet on the boot is connected to the suction machine by pressure tubing. The button on the suction base permits the patient to start and stop the negative pressure when the treatment period is

ended or the sensation of pain is present. Treatments are given at minus 30 to minus 50 mm. of mercury maintained continuously for from one-half to two hours, according to the patient's tolerance. It is possible to use suction at a continuous constant negative pressure by inserting small objects between the tube around the leg and the outside to permit a small air leakage. The clinical results are a confirmation of the beneficial effects reported by other workers with the passive vascular exercise machine. Relief from pain was noted in twelve of the sixteen cases treated by this method: three of Buerger's disease, twelve of diabetic arteriosclerosis and one of severe frostbite of the lower extremities. Capillary ecchymosis directly due to suction developed in one case. Two cases of gangrenous toes, in which amputation was considered, healed completely. Six arteriosclerotic patients reported relief from pain and improvement in walking distance. The case of frostbite responded well to suction by improvement in skin texture and relief from persistent coldness of the feet; cessation of pain while walking was also experienced. No other treatment was used in any of these cases during the course of suction therapy.

Swelling of the Upper Limb Following Radical Mastectomy

E. A. Devenish and W. H. Graham Jessop, Assistants, Surgical Unit, University College Hospital, London, in Br. J. Surg., XXV:98:261, (October) 1937.

Four cases with severe swelling were treated by a method of continuous suspension of the limb. The patient was kept in bed and the limb suspended from the hanging chain by a 6-inch bandage. The latter was secured by safety pins to the distal turn of a flannel bandage which was applied firmly and evenly to the whole limb from the axillary folds to the interdigital clefts. When there was no swelling of the dorsum of the hand, the bandage ended at the wrist. Suspension was maintained up to 24 hours a day, in the cases able to tolerate it, for a period of from four to ten weeks. In the later cases massage was given daily, the suspension of the limb being interrupted for this purpose.

Shrinkage of the limb followed this treatment in every case to a degree proportional to the amount of pitting edema present at the beginning. The rate at which shrinkage took place was estimated by displacement measurements of the volume of the limb. In one case the volume diminshed by three litres in fifteen days, but in the remainder it was considerably lower.

In no instance was a complete restoration to normal brought about. The residual swelling was of a brawny, indurated consistency and did not pit on pressure.

Fractures of the Patella

Myron O. Henry, M. D., Minneapolis, Minnesota; in Am. Jour. of Surgery, XXXVIII:-3:682, Dec. 1937.

The controversy on treatment of fractures of the patella has simmered down to employment of closed methods if there is no separation of fragments, and open methods if there is comminution and displacement, providing the patient is a reasonable surgical risk. The keynote of treatment, as Watson-Jones stated, is "restoration of the extensor apparatus of the knee without impairment of flexion." In the simple cases, splints and casts have been used successfully since the earliest times. These do not suffice in cases with separation, and, in order to gain bony union, many ingenious methods have been devised.

The optimum time for operation depends upon the general condition of the patient and the condition of the local skin. There is no reason for delaying operation if the skin of the knee is suitable, as Wilson and Cochrane advise, but, if there has been abrasion of the skin, one should postpone operation until it has healed.

A straight transverse incision above the kneeling surface is most useful and practical. The longitudinal incision often does not permit careful examination of the lateral aponeurosis, and the U-shaped, or inverted U-shaped incisions, cause more scar and frequently do not heal well at their apices. The straight incision over the center of the patella follows a skin crease and heals nicely, besides affording excellent exposure without unnecessary dissection.

The manner of suturing the bony fragments is less important. Since the advent of rustless steel wire, the author has used it exclusively for bone suture; it is tough, yet pliable, and is so completely non-irritant that removal is unnecessary unless the twisted ends happen to prick the skin.

A well-fitting plaster of Paris cylinder cast applied post-operatively adds to the comfort of the patient and the peace of mind of the

surgeon. The skin sutures should be removed in two weeks, and then a new close-fitting cylinder cast applied.

Early walking prevents quadriceps atrophy and eliminates much physical therapy. The second cast should be bivalved in four weeks (six weeks post-operative) and x-rays taken to check the progress of bone healing. Passive motions usually can be started at the end of six weeks, using the fingers to hold down the patella during the first passive flexions. Massage is best employed to teach active motion and active quadriceps contractions. The bivalved cast should be re-applied with straps for night use and for protection in walking for another month, or until x-rays reveal good bony union. Usually the patient has regained ninety degrees of flexion by the twelfth post-operative week, and then protection can be discarded. Recovery is not complete until the power of the quadriceps muscle has been fully restored, and the patient's activity should be guarded until this power has been gained.

Physical Therapy in Relation to Industrial Medicine

Frank H. Krusen, M. D., Rochester, Minnesota. In Minnesota Medicine, 21:1:30, Jan. 1938.

The chief sphere of usefulness of physical therapy in industrial injuries lies in the treatment of the large group of cases in which there has been trauma to bones, joints, muscles, nerves or skin. Hastening of restoration of articular function is one of the most important phases of this work. Another important contribution of physical therapy is in the rehabilitation of the badly maimed worker, who must be reeducated to make the best use of his limited physical capabilities. Frequently, a properly graduated routine, including surgical treatment, physical therapy, occupational therapy, the sheltered workshop, and a new type of remunerative occupation suited to the handicapped patient's limited ability, will make a happy, useful citizen and worker of a potentially permanent invalid.

Occupational therapy which plays an important part in this transition is a form of physical treatment, and properly administered under medical supervision it will aid greatly not only in restoring function but also in improving the patient's morale. Odencrantz has said: "Anything that can be done to help the handicapped build up his confidence, his morale and his ability, increases his opportunity for satisfactory adjustment."

Hydrotherapy

One of the easiest ways of stimulating peripheral circulation is to apply the time-honored contrast baths. These are applied to the extremities, by using buckets or pans as containers for the hot and cold water. If a shoulder or some portion of the trunk is to be treated, an ordinary bath spray may be used to apply hot and cold water alternately to the affected region. This will produce effects comparable to those achieved by immersion contrast baths.

Whirlpool baths (baths of whirling, aerated water at a temperature of 110°F.) are excellent for the auxiliary treatment of fractures, preliminary to massage and therapeutic exercise. These baths may be constructed for a few dollars by any plumber (specifications may be obtained from the Secretary of the Council on Physical Therapy of the American Medical Association).

Recently, underwater exercises have been used not only for the treatment of poliomyelitis but also for the treatment of extensive trauma.

Electrotherapy

The use of short wave diathermy, although much exploited, nevertheless must be considered favorably in the treatment of many types of deep trauma to soft tissues. The effects are explained merely on the basis of heating of the tissues, but this heating has been proved to reach to deeper levels than can be obtained by any other means of application. In most instances, an induction coil, cuffs, or air-spaced electrodes should be applied to the area to be treated.

Conclusions

1. The use of physical therapy may be of considerable value in the treatment of industrial injuries.
2. This type of therapy is particularly applicable to the hastening of restoration of function following trauma and to the rehabilitation of the severely handicapped patient.
3. The application of physical measures should be under close medical supervision, and specific instruction concerning treatment always should be given.
4. Many simple physical devices may be utilized in treating industrial injuries; these devices frequently may be constructed for home use.
5. Massage and manipulation always must be performed by skilled hands.

6. Occupational therapy in conjunction with other forms of physical therapy plays an important part in the rehabilitation and return to industry of the severely handicapped worker.

The Treatment of Burns

Robert F. McGandy, M. D., Minneapolis, Minnesota. In Minnesota Medicine, 21:1:17, January 1938.

When the patient reaches the hospital, he should be placed in bed under a cradle where the temperature is kept at about 90 degrees. Fluids should next be started. These can be given intravenously, but, if the patient's condition warrants, any methods may be used. It is generally accepted that saline and glucose be used in order to take care of the blood chlorides lost and to protect the liver. If the patient's temperature is subnormal, these fluids are best given at 105 to 110 degrees. Blood transfusion, except for sepsis, is best reserved for shock from trauma rather than burns. Many men recommend gum acacia in this stage as an initial measure and I heartily approve of it. A severe burn usually requires intravenous fluids for three days. A good rule for quantity is 1,000 c.c. per twenty-five pounds of body weight in twenty-four hours. A good adjuvant measure in the treatment of burns in this stage is the use of extract of suprarenal cortex. This is used in one c.c. doses and repeated at intervals.

So the ideal first dressing in extensive burns is one which not only allays pain by covering the burned surfaces but also, what is more important, prevents the loss of fluids from the blood stream. Too much credit cannot be given to Davidson, who, in 1925, called attention to the use of tannic acid in precipitating broken down burned tissue and thereby sealing off the capillary bed at the outset and preventing loss of body fluid.

Best for Broken Bones

Robert H. Kennedy, M. D. In Modern Hospital 50:1:44, Jan. 1938.

Every hospital should have one man or a small committee to supervise the care of all the fractures in that institution. In the largest institutions this may mean a fracture service; in the hospital of 200 beds, the assignment of an interested man on either the general surgical or orthopedic services; in the small open hospital, someone who has the respect of the group and will be recognized as willing to confer with any member of the staff without recompense or annexing the case.

Our aim in fracture treatment is solid union without deformity and with normal function. We are morally and legally responsible to the patient with a fracture to exert every effort to attain this ideal.

A certain minimum of equipment is needed for the intelligent care of a fracture patient. We must have an x-ray plant, some form of overhead frame, fraction splints and plaster of Paris. A splint room, a plaster room and a fracture cart are of great value and are an evidence of whether the treatment of fractures is thoughtfully organized. Too many hospitals are equipped with a multiplicity of gadgets for the treatment of fractures which few, if any, of the staff have any idea how to use properly. It is far better to keep to the simplest equipment but to insist that everyone who treats a fracture knows in detail how to use what he has. If we must purchase complicated machines let it be understood that they will be used by one man who will learn their indications and variations thoroughly. Then the chances are that the majority of these complicated machines will be found packed away in the storeroom two years later.

The x-ray plant should include a fluoroscope, preferably arranged with a table where anesthesia may be safely given and intermittent observations of the fragments made during reduction. Strict orders are necessary against undue exposure during fluoroscopy of all persons who frequently are required to be in the x-ray room. A portable x-ray apparatus is an absolute necessity if traction suspension treatment is ever used.

A physical therapy department is a valuable adjunct in fracture treatment. Its cooperation and advice should be sought, but the actual modality to be used always should be ordered by the surgeon in charge of that individual fracture patient. A general order for "physical therapy" should not be allowed in fracture cases. The physical therapy department should not be willing to accept the responsibility of initiating forms of treatment, so that there will be no question of legal or moral obligation to the patient as to the final result.

Expensive apparatus is not necessary in fracture work. The important modalities are elevation, heat and active motion. The first

should be attended to by doctors and nurses. Heat should not be applied for fifteen minutes once or twice a day only. In the early days of treatment the injured part should be kept somewhat above body temperature through the whole twenty-four hours. This may be accomplished by means of an electric heat infuser at a proper distance, a covered cradle with electric lights beneath, or some similar simple apparatus.

The function of the physical therapy technician is all important in guiding active motion, which is that accomplished entirely by the muscular effort of the patient's own injured extremity. Active motion should be commenced at the earliest possible moment; for example, in a Colles' fracture the patient should be instructed to move his metacarpophalangeal and interphalangeal joints many times a day from the day of injury on. Passive motion, diathermy and short-wave therapy are contra-indicated in fracture treatment. Hydrotherapy, muscle reeducation by gymnastic apparatus and occupation therapy are of great value in the late stages of treatment.

The Movements of the Shoulder Joint

A Plea for the Use of the 'Plane of the Scapula' as the Plane of Reference for Movements Occurring at the Humero-Scapular Joint.

T. B. Johnston, Professor of Anatomy, Guy's Hospital Medical School; in Br. J. Surg., XXV:98:252, (October) 1937.

Summary

A plea is put forward for the adoption of the scapular plane as the reference plane for the movements of flexion and extension, abduction and adduction, at the humero-scapular joint.

The fact that when the arm is raised to the vertical above the head the humerus is rotated neither to the medial side nor to the lateral side has been demonstrated.

The rotation which the humerus undergoes as it is elevated to the vertical in the sagittal and coronal planes has been shown to be an active movement designed to counteract the opposite rotation which is passively imposed on the bone during its passage, backwards or forwards as the case may be, towards the plane of the scapula.

Book Reviews

THE PATIENT AND THE WEATHER. VOLUME IV, PART 2. ORGANIC DISEASE. HYPO AND HYPERTHYROIDISM, DIABETES, THE BLOOD DYSCRASIAS AND TUBERCULOSIS. By William F. Petersen, M. D., Professor of Pathology, University of Illinois College of Medicine: with the assistance of Margaret E. Milliken, S. M. Cloth. Price, $11.00. Pp. 729, with 380 figures and illustrations. Ann Arbor, Michigan: Edwards Brothers, Inc., 1937.

This is the sixth book of this series of monographs on the patient and the weather. In this volume is presented detailed case histories showing that the meteorological environment conditions the reaction of the patient and frequently initiates the clinical alterations that can be witnessed during the course of illness. In the first part of Volume IV it was shown that meteorological conditions do influence cardio-vascular-renal dysfunction. Since these alterations enter basically into every physiological and pathological phenomenon, it is logical to draw the deduction that all other diseases must be conditioned by the weather.

The clinical observations on common endocrine disorders, the blood dyscrasias and tuberculosis are presented in this volume. In the first section from the material presented it would appear that the status of the thyroid gland would depend on the functional demand, and functional demand will depend on alteration of environment. This will be largely meteorological and seasonal. In turn the ability to respond normally will depend on iodine adequacy, on proper endocrine integration, on proper oxidation, on proper integrity and functioning of the autonomic nerve fibers, on the constitutional background and innumerable related factors.

In the diabetic the author believes that we have a varying picture, wherein, despite absolute constancy of diet and insulin dosage (in experimental animals and patients) the meteorological environment is the determining factor. In the blood dyscrasias and tuberculosis the case histories and discussions apparently demonstrate that the changes of the weather are of marked significance. These volumes contain information which is valuable to every student of modern medicine.

RESEARCH MEMORANDUM ON THE FAMILY IN THE DEPRESSION. By Samuel A. Stouffer, Professor of Sociology, University of Chicago, and Paul F. Lazarsfeld, Director, Research Center, University of Newark; with the assistance of A. J. Jaffe. Bulletin 29. *Paper. Price,* $1.00. *Pp.* 221. *New York: Social Science Research Council,* 1937.

RESEARCH MEMORANDUM ON SOCIAL ASPECTS OF HEALTH IN THE DEPRESSION. By Selwyn D. Collins, Principal Statistician in charge of Statistical Investigations, United States Public Health Service, and Clark Tibbitts, Chairman, Health Inventor, Operating Council, United States Public Health Service; with the assistance of Arch B. Clark and Eleanor L. Richie. Bulletin 36. *Paper. Price,* $1.00. *Pp.* 192. *New York: Social Science Research Council,* 1937.

RESEARCH MEMORANDUM ON SOCIAL ASPECTS OF RELIEF POLICIES IN THE DEPRESSION. By R. Clyde White, Professor of Social Economics, School of Social Service Administration, University of Chicago, and Mary K. White, Statistician, Chicago Council of Social Agencies. Bulletin 38. *Paper. Price,* $1.00. *Pp.* 173. *New York: Social Science Research Council,* 1937.

RESEARCH MEMORANDUM ON SOCIAL WORK IN THE DEPRESSION. By F. Stuart Chapin, Chairman, Department of Sociology, University of Minnesota, and Stuart A. Queen, Chairman, Department of Sociology and Anthropology, Washington University. Bulletin 39. *Paper. Price,* $1.00. *New York: Social Science Research Council,* 1937.

These volumes have been prepared under the direction of the Committee on Studies in Social Aspects of the Depression of the Social Science Research Council which was organized in 1923. These four studies are part of a series of thirteen sponsored by this council to stimulate the study of depression effects on various social institutions.

The relation between economic status and health is an important problem for everyone engaged in the treatment of disease and injuries. The relationship is not one of simple cause and effect; sickness and injury may be a cause as well as a result of poverty. It is the consensus of scientific opinion, however, that poverty gives rise to sickness more frequently than sickness gives rise to poverty. Income has no effect upon illness save as it determines or influences the mode of living of the recipient and family. Standards of living and health are also functions of personal characteristics, such as intelligence, education, resourcefulness and initiative.

The depression affected all major social institutions and the repercussions were so far reaching that scarcely any type of human activity was untouched. These volumes represent an effort to assemble the vast record of influence of this economic depression on society. These records should constitute an important preparation for meeting the shock of the next depression.

All four volumes can be recommended to physical therapists as reference books to help solve social work problems.

MENTALITY AND HOMOSEXUALITY. By Samuel Kahn, B. S., M. A., M. D., Associate Attending Neurologist at the City Hospital and Central Neurological Hospital, New York. Cloth. Price, $3.00. *Pp.* 249. *Boston: Meador Publishing Company,* 1937.

The subject of homosexuality has been one which has perplexed psychologists, sociologists and physicians for many years. References to this state of perversion of the important sexual urge have been made in hushed voice and small print. With the ever increasing interest in human behavior we are becoming more and more psychologically minded and as a result the taboo on this subject is being modified. This book is a courageous presentation of the problem of homosexuality as revealed by the studies conducted for many years in penal institutions of New York City. It may be surprising to some to learn that five per cent of males and ten per cent of females belong to this group of so-called abnormal individuals. The causes of homosexuality may be found in both biological and psychological disorders. The author has found a close correlation between homosexuality and drug addition. The average intelligence of the homosexual individual, however, has been found to be even higher than that of other groups of social delinquents observed in penal institutions. The author emphasizes the need for a more wholesome and sympathetic understanding of the factors responsible for sexual perversion so as to aid in the prevention and treatment of this individual and social problem. For those interested in this subject much valuable information may be obtained from this report.

THE MEDICAL CLINICS OF NORTH AMERICA. NEW YORK NUMBER, VOLUME 21, NUMBER 6, NOVEMBER 1937. (Sold only by a year of six consecutive numbers.) Cloth. Price, $16.00. Philadelphia and London: W. B. Saunders Company, 1937.

This volume contains a symposium on arthritis with each subject thoroughly discussed by a foremost authority. The entire subject of chronic arthritis is of interest to every physical therapist, and in addition there are four clinics on physical therapy. The clinic of Drs. William Bierman and Carl L. Levenson of Mt. Sinai Hospital gives the treatment of gonorrheal arthritis by physically induced fever. Of the forty cases of gonorrheal arthritis treated by this means, thirty-two showed a dramatic restoration to normal.

Dr. K. G. Hansson describes the use of massage and exercises in arthritis. He gives excellent descriptions of the use of body mechanic reconstruction, local active exercises, and passive manipulations.

Dr. Richard Kovacs' clinic at New York Polyclinic Medical School discusses the use of electrotherapy in arthritis, and Dr. Norman Titus of the Beekman Street Hospital considers hydrotherapy in chronic arthritis.

The management of the painful foot in arthritis from the clinic of Dr. T. Campbell Thompson at the Hospital for the Ruptured and Crippled gives many good suggestions. From a clinic at the same hospital, Dr. Cornelius H. Traeger in discussing fibrositis gives an excellent digest of the local and general physical therapy useful in this condition.

THE MEDICAL CLINICS OF NORTH AMERICA. CHICAGO NUMBER, VOLUME 22, NUMBER 1, JANUARY 1938. (Sold only by a year of six consecutive numbers.) Cloth. Price, $16.00. Philadelphia and London: W. B. Saunders Company, 1938.

This volume starts with a symposium on pneumonia. In this symposium medical diatherapy in pneumonia is discussed by Dr. John S. Coulter from the Illinois Central Hospital. The opinion is expressed that there is no evidence of a specific response to medical diathermy used in the treatment of pneumonia. However, it does seem to be of definite benefit in reducing the severity of the thoracic pain, and this fact makes it a valuable adjunct in the treatment of pneumonia.

ALCOHOL: ONE MAN'S MEAT—. By Edward A. Strecker, A. M., M. D., Sc. D., Professor of Psychiatry, School of Medicine, University of Pennsylvania, and Francis T. Chambers, Jr., Associate in Therapy, Institute of the Pennsylvania Hospital, Philadelphia. Cloth. Price, $2.50. Pp. 230. New York: The Macmillan Company, 1938.

The prevalence of the use of alcohol in our modern civilization is well recognized. The social drinker is able to partake of a moderate amount of spirited beverage which apparently enhances his enjoyment of life. For the problem drinker, however, the use of alcohol assumes a different role. For him it is a means of escape from difficult life situations. The problem drinker, therefore, is equivalent to the neurotic personality for whom a "flight into illness" is the usual mode of escape. The authors emphasize the fact that the habitual drinker is, indeed, a neurotic with the characteristic features of emotional immaturity, introversion and feelings of insecurity. Frequently it is by accident that this type of individual discovers a relief for his discomfort in a difficult social world through indulgence in alcohol. The release of inhibitions which is characteristic of the effect of alcohol upon the human being often supplies the neurotic individual with a false sense of security and social adjustment. This effect, however, being short lived needs replenishing and soon develops into a habit which eventually enmeshes its victim. The treatment of the alcoholic, therefore, is directed essentially toward the factors responsible for his neurotic behavior rather than toward the "drug."

The excellent chapters on treatment sound an encouraging note to replace the old concept of the incurable drunkard. Although there will be many who will disagree with much of the material presented, nevertheless this book gives an excellent presentation of this interesting problem.

HANDBOOK OF THERAPY. Edited by Morris Fishbein, M. D., Editor, Journal of the American Medical Association, Chicago. From the Handbook of Therapy by Oliver T. Osborne and Morris Fishbein. 11th Edition. Fabrikoid. Price, $2.00. Pp. 812. Chicago: American Medical Association, 1937.

Any book that has had eleven editions must be useful. It contains a summary of the most recent treatment of infectious diseases, diseases of the respiratory tract, gastro-intes-

tinal tract, kidney, metabolism, heart, blood and blood making organisms, thyroid, nervous system, skin, eye, ear and the venereal diseases. It is a convenient size and can be highly recommended.

THE THINKING BODY. A STUDY OF THE BALANCING FORCES OF DYNAMIC MAN. By Mabel Elsworth Todd. Foreword by E. G. Brackett, M. D. Cloth. Price, $4.00. *Pp.* 314, *with* 91 *illustrations. New York: Paul B. Hoeber, Inc.,* 1937.

There is a close relationship between good body mechanics and good health but teachers of physical education who specialize in the subject of good posture think too much of the importance of this association. The opening statement of this book is: "We sit and walk as we think, watch any man as he walks down the avenue and you can determine his status in life." Is this a fact? The posture and manner of Edison or Steinmetz when walking down the street would not have placed them as great thinkers.

This volume makes interesting reading and the originality of the presentation is attractive even though the soundness of many of the author's views may be questioned. The subjects considered are: function and form in human dynamics; reacting mechanisms; mechanical forces, functional adaptation and structural change; the working skeleton; dynamic mechanisms; balancing forces to stand erect; balanced forces in walking; breathing; the proprioceptive system and physiological balances. Under these subjects are excellent discussions of mechanical factors and other factors involved in the control of muscles that can help in correcting defects of posture and locomotion. The interrelationship of physical and psychological forces in our daily life are discussed.

Most of the statements are clear and practical, but at times clearness is sacrificed for the picturesque. For example: "The use of hissing as a device for relieving strains and to deepen breathing through imagery and muscular reflexes leads us back to the initial and most important concept that the body is a mechanical structure subject to mechanical laws and that it is also a living organism and must maintain chemical balance." Nevertheless it is an original book which should be read by physical therapists.

THE SURGICAL CLINICS OF NORTH AMERICA. PHILADELPHIA NUMBER, VOLUME 17, *NUMBER* 6, *DECEMBER* 1937. (*Sold only by a year of six consecutive numbers.*) *Cloth. Price,* $16.00. *Philadelphia and London: W. B. Saunders Company,* 1937.

The symposium on fractures in this volume is of interest to physical therapists because it contains two practical clinics on physical therapy. Dr. V. W. Murray Wright of the Jewish Hospital in his article on "Practical Fracture Physical Therapy" emphasizes that physical therapy should be started before the fracture is reduced, not after it has united. He shows how "open types" of immobilization will enable gentle heat and massage to be given daily after reduction. A table of practical exercises for restoration of function is given, and these exercises are considered in detail under each common fracture.

Dr. Robert R. Impink, Miss Clare S. Spackman and Dr. Walter Estell Lee describe the use of occupational therapy in the treatment of fractures and give illustrative cases.

NEUROLOGY. By Roy R. Grinker, M. D., Associate Professor of Neurology, The University of Chicago. Cloth. Price, $8.50. *Pp.* 948, *with* 401 *illustrations and diagrams. Springfield, Illinois: Charles C. Thomas,* 1935.

This new textbook of neurology is a very complete and informative volume. It is intended primarily for students of medicine but is an excellent reference text for physicians and those particularly interested in diseases of the nervous system. The author has attempted to correlate biological data with the clinical manifestations of disease processes in the brain, spinal cord and peripheral nerves. The early chapters deal with general embryological and anatomical considerations as a basis for the later chapters on neuro-physiology and clinical neurology. Reference is frequently made to more recent contributions from the research laboratory which are applicable to the various neurologic syndromes observed in the human being. The plan of presentation is quite similar to previous textbooks of neurology but the material is freshened with many excellent illustrations and diagrams. Although critical students of neurology may differ with the author in his interpretation of various syndromes, the book in general may be accepted as a satisfactory treatise of a difficult subject.

THE DIARY OF A SURGEON IN THE YEAR 1751-1752. *By John Knyveton, Licentiate of the Society of Apothecaries; Doctor of Medicine of the University of Aberdeen; Teacher of Midwifery to and Man Mid-Wife in Infirmary Hall; Surgeon's Mate, H. M. S., Lancaster. Edited and Transcribed by Ernest Gray. Cloth. Price,* $2.50. *Pp.* 322, *with* 9 *illustrations. New York: D. Appleton-Century Company, Inc.,* 1937.

Ernest Gray has reconstructed after the most exact historical research the adventures of an eighteenth century medical student and surgeon. This is a book to read when feeling discouraged with medical practice of today. It is difficult for us in these days of asepsis and sanitation to realize the state of affairs in the large city hospitals of 1751. The author gives many interesting accounts of medical conditions of those days. He describes one visit with his teacher to the hospital. The doctor stopped at the entry to put on a small coat, as his full skirted one would have brushed the walls and swept from them the lice and other insects which infected them. The beds in the ward were of moderate width, "containing not more than three to four patients, but these placed the feet of one to the head of another so that each receives not the tainted effluvium of their respective complaints." "The air rather foul, especially in the surgical ward . . . but this of course no more than can be expected since the windows cannot be allowed open."

After Knyveton had served his apprenticeship in London he became a surgeon's mate in the British Navy on the Lancaster, a ship carrying twenty-four guns. He described the treatment of tropical diseases and the wounded after a battle with pirates, and also gave many interesting adventures of his voyages. This book can be recommended as an extremely interesting and readable tale of adventure.

PLAY GAMES. By Albert E. Wegener, Director of Physical Education, Drew University. Cloth. Price, $2.00. *Pp.* 176. *New York: The Abingdon Press,* 1930.

The experience of many years as a director of groups of normal people at play is reflected here. It is written entirely with the normal child or adult in mind. It is a list of hundreds of games of all sorts with suggestions for countless variations. The classifications are excellent and make the material very accessible. The book is divided into three sections: namely, physical play, mental play and social play. In each of these sections the games are classified objectively; for instance, all games with racing as the main object, from baseball (where running to bases is the main object), to carrying beans on matches a given distance competitively, are listed in one section. This objective classification carries through all the sections of the book. The games are concisely and briefly described.

There are many suggestions that would be helpful to those working with handicapped children in groups, but from this point of view the classifications are not helpful so that a quantity of material would have to be reviewed to find those games suitable for the handicapped.

PRACTICAL CHIROPODY. By E. G. V. Runting. 5th Edition. Cloth. Price, $3.00. *Pp.* 200. *St. Louis: The C. V. Mosby Co.,* 1937.

This is the fifth edition of this handbook since 1925. It is based on the author's forty years of practical experience and teaching. The work has been compiled from notes on lectures given at a school for chiropodists. Physical therapists often are consulted for the minor foot affections considered in this volume and will probably appreciate the helpful suggestions which are included.

BRITISH HEALTH RESORTS, SPA, SEASIDE AND INLAND. Edited by R. Fortescue Fox, M. D., Lond., F. R. C. P., F. R. Met. S., Hon. Member of the American Climatological and Clinical Society, of the German Balneological Society, of the Austrian Society of Balneo- and physiotherapy, of the Moscow Society of Internal Medicine, of the Moscow Therapeutic Society, and of the Roumanian Society of Medical Hydrology and Climatology. With a foreword by The Rt. Hon. Sir Kingsley Wood, Minister of Health. Cardboard. Price, 2/6. *Pp.* 288. *London: J. and A. Churchill, Ltd.,* 1937.

This book gives the principal objects and the work of the British Health Resorts Association, 1931 to 1936. There are chapters on climate, health and the British resorts; the British spas; the sea coast resorts of the British Islands; the winter health resorts on the coast; some inland health resorts and spas and climatic resorts of the British Commonwealth Overseas. It can be recommended as giving excellent descriptions of British health resorts.